FIRST AERO WEEKLY IN THE WORLD

MAR 15 1938

FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

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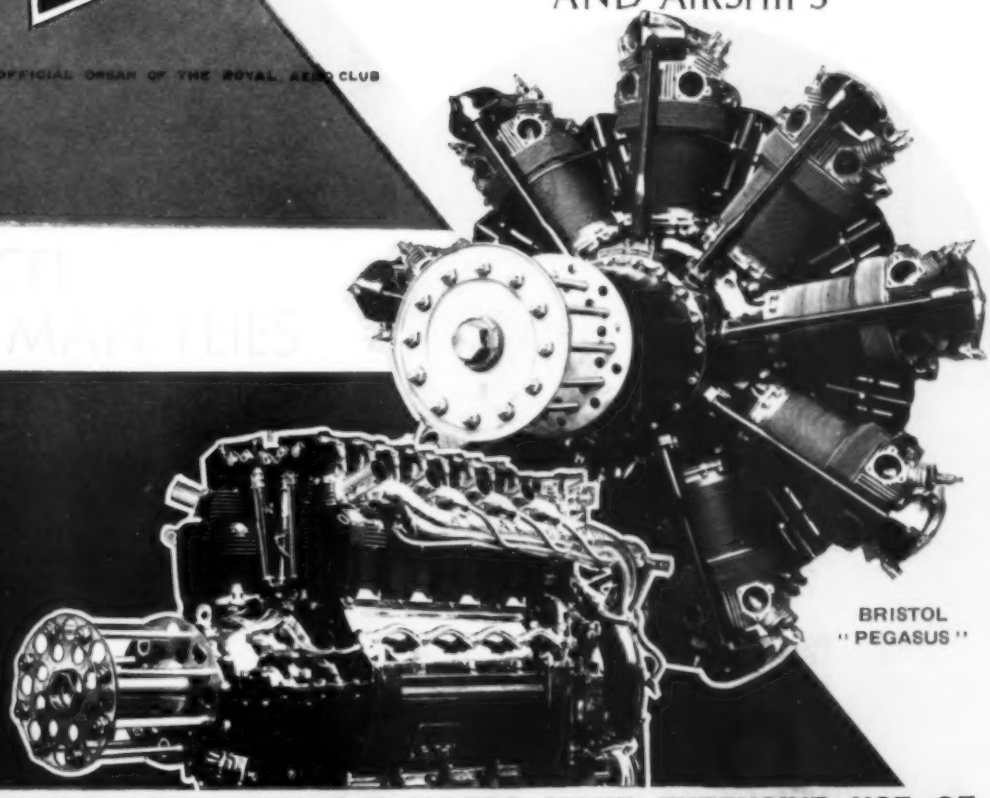

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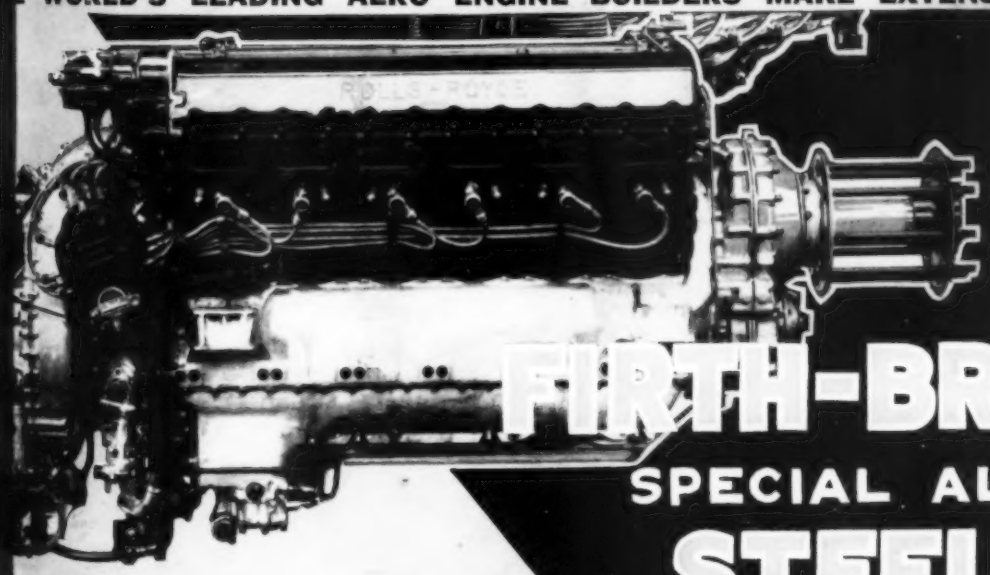

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FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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Editorial, Advertising and Publishing Offices: DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1

Telegrams: Truditur, Selist, London. Telephone: Waterloo 3333 (50 lines).

HERTFORD ST., COVENTRY.	GUILDHALL BUILDINGS, NAVIGATION ST., BIRMINGHAM, 2.	260, DEANSGATE, MANCHESTER, 3.	26B, RENFIELD ST., GLASGOW, C.2.
Telegrams: Autocar, Coventry. Telephone: Coventry 5210.	Telegrams: Autopress, Birmingham. Telephone: Midland 2971.	Telegrams: Iliffe, Manchester. Telephone: Blackfriars 4412.	Telegrams: Iliffe, Glasgow. Telephone: Central 4857.

SUBSCRIPTION RATES: Home and Canada: Year, £1 13 0, 6 months, 16s. 6d., 3 months, 8s. 6d. Other Countries: Year, £1 16 0, 6 months, 18s. 0d., 3 months, 9s. 0d.

No. 1523. Vol. XXXIII. MARCH 3, 1938. Thursdays, Price 6d.

The Outlook

A Surplus of Pilots

COMMENT was made last week in these columns on the phenomenon (for it really is one) of the readiness with which British youth will accept short-service commissions. Now comes the news that the 1,750 pilots which the Air Force needed for the last official year were all obtained before the year had expired. From the point of view of national safety this is a matter of great satisfaction. Air Force expansion, so far as personnel goes, is making even better progress than was expected. It may be that the motive in many cases is not a patriotic desire to fight for one's country, but a seizing of the chance to learn to fly gratis and to get four years of flying in Government machines and with Government petrol. Motives are no concern of the recruiting sergeant, so long as those who metaphorically take the King's shilling are of the type which will fight hard if ordered to do so.

Perhaps the more thoughtful ones among the new pilots hope that at the end of their four years they will be given permanent commissions, and it may well come about that this will happen. The number of permanent officers drawn from Cranwell and the universities has not been greatly increased, while the larger Force must mean a need for more senior officers. The list of officers of Air rank has been considerably swollen of late, and the number of higher appointments at the Air Ministry is on the increase. This week we publish the appointment of an Assistant Chief of the Air Staff, and also the creation of duplicate deputy directorates of operations.

The original annual intake of permanent officers was calculated on the basis of a very small Air Force, so as to provide just enough careers for all of them. The immensely increased Force means that more permanent officers will be needed. Evidently, as the intake from Cranwell and the universities has not been correspondingly increased, the Air Council must contemplate making good the deficiency by granting more permanent commissions to short-service officers.

This is a welcome prospect. However much we may all congratulate the country on securing even more pilots this year than it actually needs, there is always an uncomfortable feeling that some of the officers themselves may have to go through hard times, when they go on to the reserve, before they can secure civil appointments. It is pleasant to think that a substantial number of them may be able to make the Service their career in life and end up, perhaps, as Air Vice-Marshals.

For another reason the present excess of pilots is welcome. An Air Ministry announcement this week provides for the transference of short-service officers from the active list and from the reserve to the Air Department of the Navy. It is impossible to foretell how many will apply for the transfer, but if the number is considerable the figures of Air Force expansion will be reduced by so much. The present surplus will at least go some way to make good that loss.

Directing Operations

THE post of deputy director of operations at the Air Ministry has now been split in two, and there will in future be one deputy director for Home operations and another for operations overseas. This step cannot have been taken any too soon, for obviously the increase in activity both at Home and overseas must have become greater than one deputy director could manage.

One need hardly expatiate on the increase in Home activities. The mere multiplication of squadrons sufficiently explains that. Air Exercises must now be quite a complicated business to arrange. Overseas the increase is less obvious to the eye, partly because, unless on travels, one does not see the squadrons at work, and partly because the increase of squadrons in the overseas Commands has been much more modest than the increase in the Bomber and Fighter Commands. But it is obvious that the importance of overseas operations is increasing. The formation of No. 223 (Bomber) Squadron at Nairobi indicated that that was happening, and the recent large-scale exercises at Singapore emphasised the point. Cyprus is a place which must wait upon political developments, but it is easy to imagine the D.D.O. (Overseas) spending some thought upon Aden, and also on Hong Kong. Basra, of course, must always be operating, while Dhibban will be a hive of flying activities. There are many strategic points in the overseas Commands, and the study of them is fascinating. Probably no one in the Air Ministry will have a more interesting job than will Wing Commander Coryton, the new D.D.O. (Overseas).

Incredible

THIS week's prize for puerility must surely go to the Sunday newspaper air correspondent (or to his employers, who, presumably, demand this sort of thing) for his long front-page story about the possibility of the missing long-range Wellesley having been lured out to sea by wireless bearings transmitted by a foreign power posing as an Air Ministry station, and then "brought down" in order that its "geodetic secrets" could be discovered.

Ordinarily, a penny-dreadful tale of this kind has no effect other than to provide a good many people with a good deal of amusement. In such circumstances as the present, however, its publication is nothing less than rank bad taste, especially in view of the feelings of the relatives and friends of the missing crew; they must be a sad prey to a thousand hopes and fears, and in no state of mind to perceive instantly the futility of such ideas.

There is one reassuring aspect: casual conversations overheard afterwards suggested that the story had proved too much for the digestive powers even of the readers of the particular paper in which the story appeared.

Grid Dangers

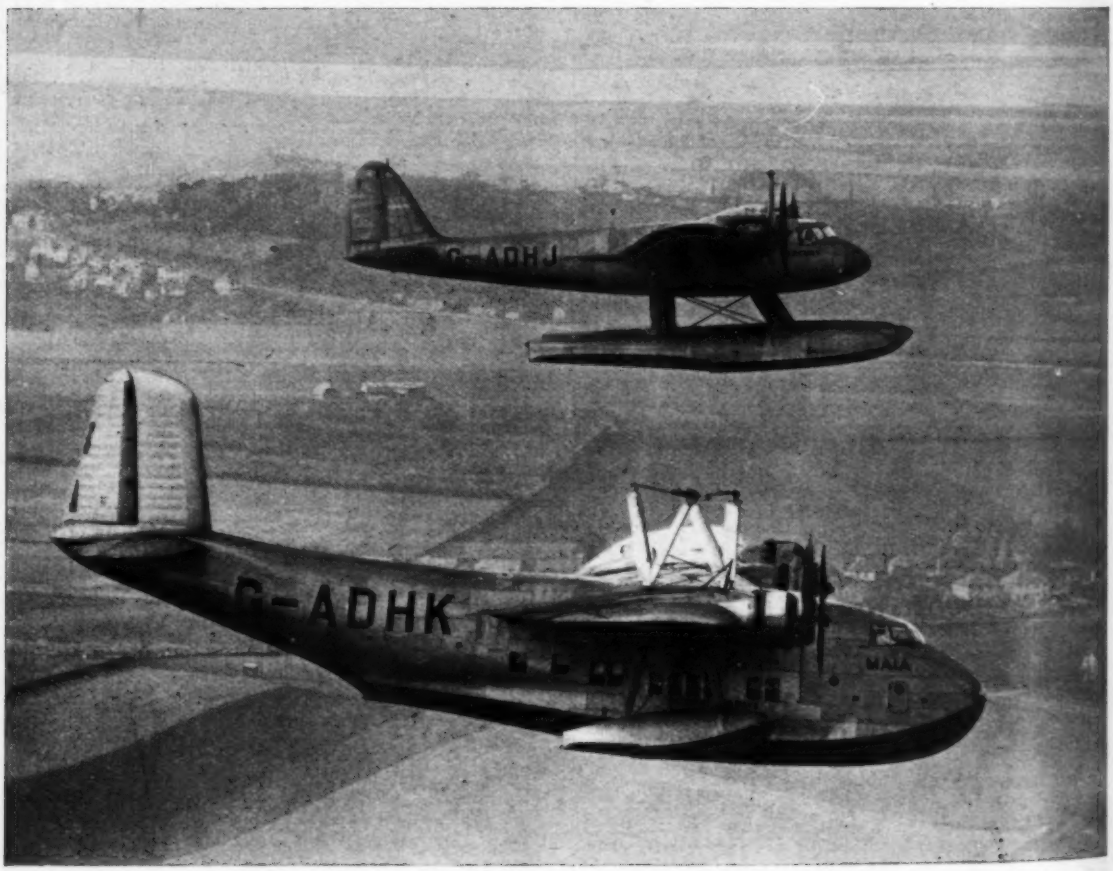
TWO more accidents in the last fortnight, involving aircraft and electric power cables, suggest that something should be done to combat what is becoming an undeniable menace.

At least an official enquiry into the matter might be held. That there are arguments questioning the existence of any danger we well know. It is maintained that a pilot who flies low enough to get himself mixed up with power cables is asking for trouble; that people who strike them when making forced landings are *in extremis* in any case, and are just as likely to hit trees, factory chimneys, telegraph wires or other obstacles which, while of less sinister reputation, have much the same effect on the fragile structure of an aeroplane; and that the aeroplane will be just as likely to ignite, whatever the cause of its downfall.

This slightly cynical attitude, too often encountered in aviation, is all very well, but the fact remains that power-cable fatalities, either to military or to civil aircraft, seem to be almost weekly occurrences. Cynicism will not save lives.

If we are to accept the contention that the cost of putting grid cables underground would be prohibitive, let us explore ways and means of minimising the danger. The existence of grid lines might be made more obvious to the pilot flying in bad weather by basing each pylon on a chalk circle, or (in the face of protests from nature-lovers) painting it some contrasting colour. Again, lines which cross hill-gaps likely to be used by weather-pressed pilots might be strung with small objects, as are telegraph wires near game preserves; or, better still, the cables taken underground at such spots. Thirdly, special distinctive markings might be made where grid lines cross or adjoin fields which would otherwise be inviting for forced landings. Certainly no cable should be permitted above ground in the vicinity of aerodromes.

It would be interesting to hear the views of pilots who fly regularly in pylon-infested parts of the country.



UNSHACKLED: Opposing aerodynamical forces complete the first "public" severance of the Short-Mayo combination, as described—and illustrated by a cine film—on page 209. This picture, dramatic in its detail, records for posterity a memorable moment in the history of flying.

(CONTINUED)

Slotted Fighters

GERMANY has stolen a march on us by taking the first Handley Page slotted single-seater fighters (Messerschmitt B.F.W. Me.109) into service. Performance figures for this type of machine are still withheld, but it is said that the speed range sets a new record for fixed-wing aeroplanes. The top speed, of course, will be very much greater than that of the Westland Lysander army co-operation machine, though the landing speed will almost certainly be rather higher.

It is a somewhat striking fact that many years ago British designers were experimenting with slotted single-seater fighters, but these were old-style biplanes which would not benefit to the full from the installation. To-day, when practically every device—the v.p. airscrew, low-drag cowling, retractable undercarriage, and so forth—has been applied to the fighter to extract more speed, we have not one modern monoplane fighter with lift-slot equipment.

280—*Plus*

THINGS have changed indeed when, to get the truth, one has to add something like 15 per cent. to a figure quoted by the Air Ministry and a manufacturer for the top speed of a Service aircraft. Time was when one automatically deducted a considerably greater percentage in order to arrive at the speed attainable in service, after Ministry "gadget wallahs" had festooned the long-suffering airframe with barbarous excrescences. But there seems to be very little doubt that the Bristol Blenheim medium bomber is faster by far than we have been given to suppose; some specific figures are quoted on page 212 of this issue.

That fact, in itself, is comforting enough, but there is even more cause for elation when it is realised that a standard British bomber, already in service in very considerable numbers, is as fast as, if not faster than, several of the new Continental twin-engined *fighter prototypes*.

A Principle Proved

WITH the public demonstration last week of the "separation" of the two components of the Short-Mayo composite aircraft *Maia* and *Mercury*, Major R. H. Mayo may be said to have proved what he set out to prove, i.e., that it is possible, safely and surely, to launch one aircraft from the back of another in flight. The application of the principle is, strictly speaking, a matter for others to decide. It may be wide or it may be narrow; that will depend mainly upon the degree to which other forms of "assisted take-off" can do more or less and do it better or less well. Full-load trials still have to be made, but the ease and smoothness with which the separation took place gives one no cause for misgivings on that score.

The most pleasing feature of the breakaway, and one for which Major Mayo and the Short designers must be given their full share of credit, was the almost mathematical precision with which the two machines parted. One of the risks, admitted by Major Mayo, but claimed by him to have been foreseen and guarded against, was that an instant after the separation the upper component might climb and slow down while the lower dived and accelerated. Should this happen, the tails of the two machines might have touched. Visual and cinematographic evidence showed quite definitely that there was no relative movement in a horizontal plane until the machines were some 50ft. apart. This is brought out very strikingly in the strips of cine film published on page 209.

Another possibility was that if, at the instant of separation, the two machines yawed slightly in relation to one another, one of the floats of the upper component might get into the airscrew disc of the lower. Here again the pessimists were confounded. There is no trace visible in the cine film of any such movement until the two aircraft are well separated and clear of any danger.

Thus, although the separation with *Mercury* loaded up to its "Atlantic" gross weight of 20,500lb. has not yet been attempted, it can be claimed that Major Mayo has proved his contention.

Helicopter Hopes

WHEN a firm has spent some six years on calculations and experiments a certain amount of reticence is understandable. Professor H. Focke, of the Focke-Wulf firm in Bremen, began to interest himself in helicopter problems in 1932. The first free flight of the Focke-Wulf F.W.61 helicopter was made on June 26, 1936, and one year later the machine broke by a wide margin all the then existing world's records for helicopters. Some months ago Fräulein Hanna Reitsch flew a second machine from Bremen to Berlin without landing, and the other day she made a free flight inside the Deutschlandhalle in Berlin.

That the control problem has been solved by Herr Focke and his collaborators can thus no longer be doubted. Sheer performance is now a matter for refinement in the aerodynamic design of the machine itself, regarded purely as an aircraft. The unfaired rotor heads and the two open-girder structures which carry the two rotors must obviously offer a great deal of reducible drag, and there are probably other directions in which it can be "cleaned up."

Little has been allowed to become known concerning the details of the F.W.61, but in an article contributed to the German aviation journal *Luftwissen*, Professor Focke does disclose a few interesting features of his machine. For instance, the drive to the two rotor heads is by bevel gears, friction clutch and inclined shafts. The blades are hinged to the rotor heads, and have their angle of incidence controlled in such a manner that the rotors provide all control with the exception of directional.

One of the most interesting and significant aspects is the high rate of climb, which exceeds by far that of the Autogiro and is even slightly better than that of the Focke-Wulf Stieglitz, being 3.6 metres per second. When flown as an Autogiro the F.W.61 had a climb of only 1.3 metres per second. The power loading is about 14 lb./h.p. In speed also the machine was superior when flown as a helicopter.

Completing the Circuit

DURING the past fortnight two important advances have been made in the construction of what may reasonably be called the Empire world air services.

Just over a week ago the Imperial Airways boat *Centurion* left Southampton for Karachi, Calcutta, Burma and Malaya, with the first batch of unsurcharged first-class mail carried to these parts under the new scheme. A few days later a P. and O. liner left India carrying the last consignment of sea-borne letters. The all-mail-by-air scheme has now been in action on the African route for nearly a year, and ordinary mail will be flown through to Australia in the early summer.

It is significant and almost encouraging to find that, so far as the general Press was concerned, the matter was treated as one of natural sequence and not of news value. That is the state of mind which is wanted in considering air transport as such. It is hardly necessary to say again that the fact that the Post Office, a most conservative organisation—rightly so—is now treating air transport on level terms with other means is of the greatest importance.

At the same time, the first stage in the trans-Canadian air service was flown on March 1, when a machine was due to leave Winnipeg for Vancouver. The Canadian Ministry of Transport expect that the Montreal-Winnipeg section will be in action during the summer, and that within a year the complete service should be in operation. When the Atlantic air services are flying on a regular semi-commercial basis, it will only be necessary for the projected Pacific service to be started, and the girdle will be complete.

DIARY OF FORTHCOMING EVENTS—PAGE 217

TRAINING AT

Flying the Miles Magister—and Laying the S
Machine Designed to Train Pilo

EVEN were there no other reasons, the Miles Magister is particularly interesting as a flying machine because it is the first basic trainer of the new era and because it is a low-wing machine with a full aerobatic C. of A.

Since the majority of present-day military and civil types are of such design it was obvious that it would soon be necessary to train both civil and Service pilots from the very start on the kind of machine which they would eventually need to fly. In the ordinary course of events nobody who can handle a normal training biplane with proficiency is liable to go very far wrong with any type of machine, but the psychological effect of a drastic change-over must not be forgotten and there are, in fact, one or two flying characteristics of the low-wing machine which are not repeated in one of what is still, for some reason, called "conventional" design.

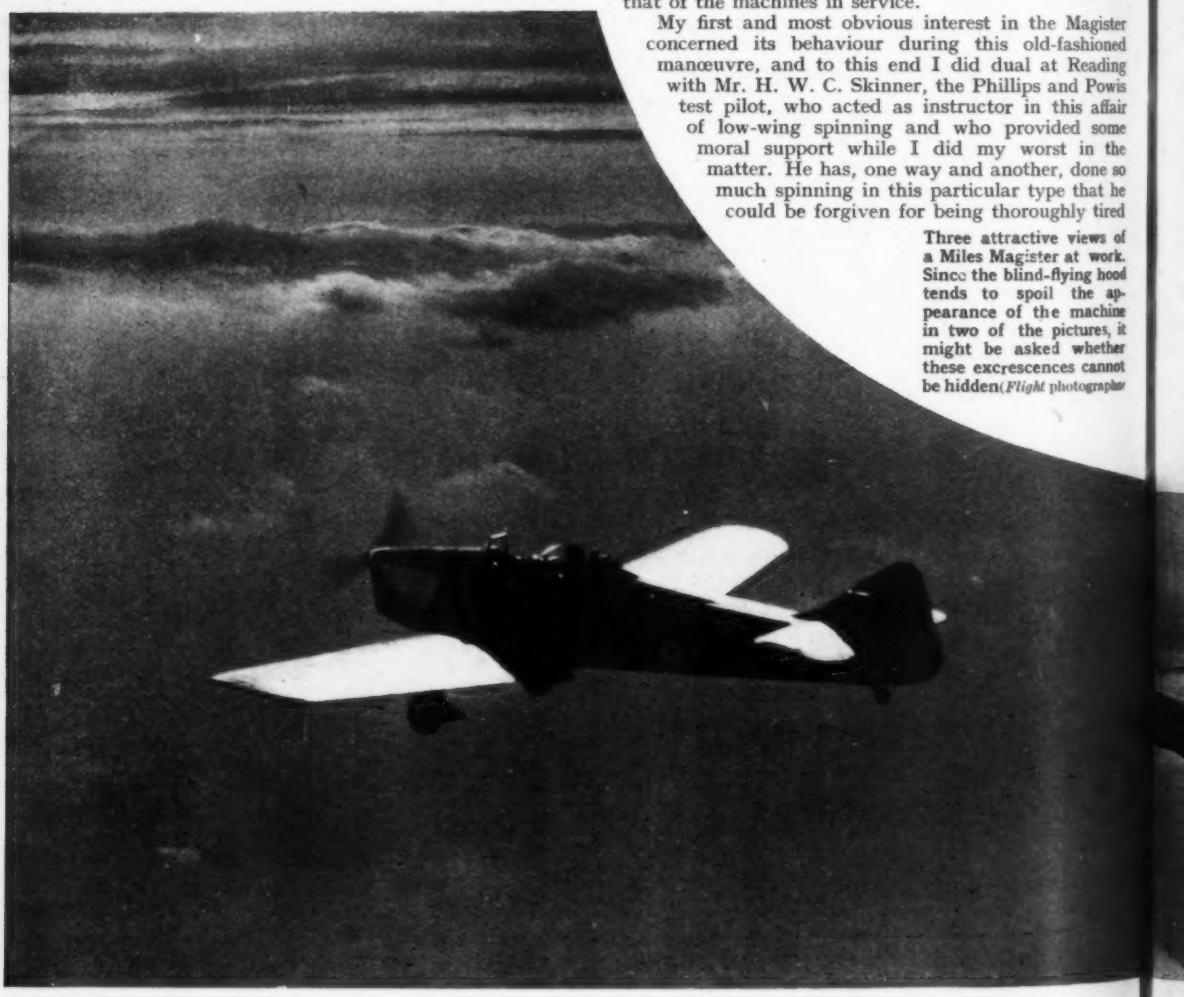
The firm of Phillips and Powis were in a good position, since they had already been producing low-wing types for a number of years, and the Magister may virtually be considered as a natural development of the Hawk Major. Various important changes and modifications have, of course, been necessary in order to bring the Magister into line with accepted ideas on aerobatic manners and strengths, but the basic design is unaltered.

A third, and perhaps more important, reason why the Magister has a special interest from the pilot's point of view concerns the many opinions which have lately been current on the spinning characteristics of the low-wing type and (because of the work for which it is being used) of the Magister in particular. The fact of the matter is that the introduction of the machines designed on what has been called the "modern formula" has changed most of our ideas on the subject of spinning. Whereas in the old days every machine except those of the very largest size were automatically tested and expected to behave quite normally in a spin, the tendency at present is to treat this manœuvre as one which should never be used. A comparatively recent Air Ministry demand in the matter of tail parachutes for all spinning tests effectively echoes official feeling in this matter. It would probably be true to say that no two low-wing machines spin or recover in quite the same way, and that few, if any, machines of this type, other than the Magister, have been allowed to do more than one or two turns before recovery.

Practical Demonstration

Nevertheless even if the machines which a pilot will eventually fly have not been and are not expected to be spun, it is obviously necessary that he should both know how to recover and have practice in this recovery during his training. Furthermore, this practice and experience should preferably be gained on a type which might reasonably be considered to perform in a similar manner to that of the machines in service.

My first and most obvious interest in the Magister concerned its behaviour during this old-fashioned manœuvre, and to this end I did dual at Reading with Mr. H. W. C. Skinner, the Phillips and Powis test pilot, who acted as instructor in this affair of low-wing spinning and who provided some moral support while I did my worst in the matter. He has, one way and another, done so much spinning in this particular type that he could be forgiven for being thoroughly tired



Three attractive views of a Miles Magister at work. Since the blind-flying hood tends to spoil the appearance of the machine in two of the pictures, it might be asked whether these excrescences cannot be hidden (*Flight* photographs)

G TO-MORROW

Laying the Spinning Bogy : Some Experiences with a Train Pilot of To-morrow's Types.

By "INDICATOR"

of the whole business. However, he proceeded to demonstrate a long-period spin and the recovery therefrom and afterwards handed over to me.

After two or three turns I always tend rather to lose interest in the labour of counting these turns, but I should say that the maximum number, carried out consecutively both to the right and to the left, was something like fifteen. And if a machine is to develop any unreasonable characteristics during the spinning process these should certainly appear some long time before the fifteenth turn. Actually, the Magister does not lose height very rapidly during a spin and it was not necessary to waste too much time in climbing up to a safe height; 5,000ft. was our starting point on each attempt.

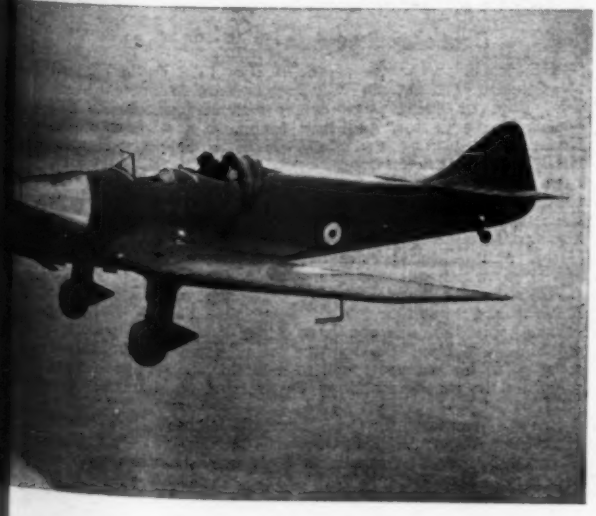
Let it be admitted straightway that a machine of this type does not, and cannot be expected to, act quite like a biplane during a spin. It would only be curious if it did. Nevertheless, beyond the fact that reasonably vigorous recovery measures had to be taken, I was not told anything about such differences before leaving the ground. Yet no particular difficulties were experienced, and the sensations were not sufficiently different from those noticed with other "conventional" trainers to cause anything more than interested comment after returning to earth.

Differences

So far as right-hand spins are concerned, at any rate, one's weight is rather disconcertingly offset—a fact which might possibly worry the uninitiated new-comer into the belief that there was something wrong—and every third turn is made at a somewhat swifter tempo. Both these characteristics are apparent also in left-hand spins, but in this direction they are not sufficiently marked to be noticeable. The autorotation begins without preamble just as soon as the controls are crossed at or about stalling speed.

During recovery conventional ideas about centralisation or "easing the stick forward" must be forgotten. In fact, I was taught to use opposite rudder in my original training, so the fact that this control was present for use and not merely for ornament did not come as a surprise. The stick, however, must definitely be moved forward of the neutral position, and, as the resisting pressure is not inconsiderable, there is no question of "easing."

After six, twelve, or fifteen consecutive turns in either direction, let it be impressed, the firm use of full opposite rudder, followed immediately by forward pressure on the stick, causes the Magister to stop spinning without a moment's hesitation. It is difficult to estimate the speed of recovery after a very large number of turns, but it seemed that the rotation could be stopped always in something rather less than a whole turn. Needless to say, with a machine as clean as the Magister quite a lot of speed is gathered during recovery from the diving position and the pull-out should be done without unreasonable hesitation.



As an aerobatic or *ab initio* trainer it is difficult to find fault with the machine except, perhaps, that it is a little too easy to fly—a fault which may be said to have applied to almost every training aeroplane that has ever been built. For best results the take-off must be made in the usual low-wing manner, getting the tail well up for initial acceleration and easing the stick a little back again before take-off speed is reached, so that the machine is allowed to show the necessary signs of being air borne. The process of landing has that air of easy finality which one has learnt to expect in the low-wing type—a feature which discourages pump-handling and which gives one the impression that the machine has landed itself.

Simple Aerobatics

Where aerobatics are concerned, I contented myself with a few vertical turns and straightforward loops. The latter appeared to be best carried out with an initial speed of about 140 m.p.h. and the circuit graduated on the stick so that the constant pressure was half as much again as that normally experienced through the action of gravity; by this means it was possible to loop without any appreciable loss of height. As might be expected, the ailerons are a little heavier than those which are customary on aerobatic biplane types, but little pressure or movement is necessary in going from bank to bank unless the change-over is required to be very rapid.

From the initial training point of view it is a good thing that the Magister should have the now almost universal split flaps so that the pupil, from the very start, learns to make use of them. Though not quite so potent, perhaps, as those, for instance, of the Whitney Straight, they

are efficient enough, yet not so efficient that the hold-off from a natural approach speed is dangerously shortened in time, or that the change of angle during the landing process is too difficult for the new-comer.

There was practically no wind on the particular day when I flew the machine, and the float from an approach speed of 60 m.p.h. with the flaps down was quite sufficient to provide the necessary time for landing adjustment. Incidentally, the flaps are vacuum-operated on the Theed system, their operation being quite automatic, following the movement of a small sliding control placed below the throttle gate. Below this flap control is the hand-brake lever, whilst the trimming lever is on the right-hand side of the cockpit to match the throttle control.

Altogether, it must be admitted that it was a pleasant and interesting experience to treat a low-wing type, for once, as one would treat any of the aerobatic trainers on which most of us were originally educated. An experience, too, with a moral.

MILES MAGISTER.
(130 h.p. Gipsy Major).

Span	33ft. 10in.
Length	25ft. 3in.
Weight, empty	1,240 lb.
All-up weight	1,825 lb.
Maximum speed	145 m.p.h.
Cruising speed	125 m.p.h.
Landing speed	45 m.p.h.
Range	400 miles.
Service ceiling	18,000ft.
Rate of climb at sea level	1,200ft./min.

Makers: Phillips and Powis Aircraft, Ltd., Reading Aerodrome, Reading, Berks.

HAMPSHIRE'S TWELFTH

IN these hard times, when so many of the young people who might be supporting flying clubs are very naturally going into either the Reserve or the Volunteer Reserve, every club is, to some extent, feeling the pinch, but there could be no complaint about the way in which members and guests supported the Hampshire Aeroplane Club's twelfth annual dinner. Unfortunately, the date clashed with that on which A.S.T. held its "house-warming" for the new mess, but as rooms at the South Western Hotel, Southampton, where the Club's party was held, had necessarily to be booked up some two months in advance, they can hardly be blamed for this minor contretemps. In fact, a number of guests made the best of both worlds, motoring sharply up to Hamble later on.

In the absence abroad of Lord Louis Mountbatten, the president of the Club, the Rev. E. Bruce-Cornford, was in the chair.

The first name on the toast list was that of Councillor R. J. Stranger, the chairman of the Southampton Airport Committee, who, in proposing the toast of the Club, said how useful this Club had been in the early days of the airport. He mentioned that plans for a new terminal building and a big hangar were being prepared, and added that at present not an inch of hangar space was available at the airport. The people of Southampton were glad, too, of the Empire Base, and proud, in particular, of *Centaurus'* recent survey flight to New Zealand and back. He asked whether a junior section of the Club might not be a good thing.

In his usefully abbreviated reply Mr. W. L. Gordon, the managing director, mentioned the two trophies which were to have been presented at the dinner, but said that the recipients, shy or otherwise, had failed to turn up. These trophies, as a matter of fact, were those for blind flying, which was won by Mr. Ingle-Finch, and for safe flying, which was won by Mr. Millar. The latter competition, by the way, involved tests of such matters as ground handling, starting, and so forth, as well as of flying ability, and the regulations might well form the basis for similar competitions at other clubs.

The Rev. Bruce-Cornford welcomed the guests in an amusing but not always audible speech, and Mr. J. G. Gibson, of the Air Ministry, replied in the unavoidable absence of Sir Francis Shelmerdine. He reminded his hearers that the Hampshire Club was the sixth to be formed. Finally, Mr. F. D. Bradbrooke proposed, with the help of a couple of apt stories, the health of the chairman. Dancing followed according to age-old custom.

Border Raid—1938

ON March 8, between 11.30 a.m. and midday, the Border Flying Club is expecting an attack by sundry club members and others from different parts, Carlisle aerodrome being defended by machines belonging to the Border Club and Newcastle Aero Club, as well as by any other machines which may be available. "Visiting" machines, it should be stressed, must travel to Carlisle by means of one of four different routes—these being down the Glenkens, Sanquhar, Liddesdale or Moffat Valleys.

Incidentally, one of the members of the Border Club has evolved a new type of obstruction flag, the support for which consists of a half-loop of medium-gauge wire with each end embedded in the ground. Although the flag may be clearly seen, it is low enough to be below a machine's wings, while the undercarriage or tail wheel will merely push the half loop into the ground. Furthermore, since the flag "pole" is parallel with the ground, the flag itself can be more easily seen from the air. Remembering the amount of necessary work which has been carried out on the surface of Carlisle Airport, it was not unnatural that some attempt should be made to produce an obstruction flag which is at the same time less damaging and more clearly visible than that normally used. It is not often that serious thought is expended on such small but important causes of worry and damage.

The G.E.'s Charter

NEWLY constituted under the less unwieldy title of "The Aircraft Engineers' Association," the former Association of Aeronautical Ground Engineers is to hold a first general meeting at The Feathers Hotel, Broadway, London, S.W.1, at 8 p.m. on Monday, March 14.

Capt. A. T. Paterson, the hon. secretary and treasurer, sets forth the aims of the reorganised Association as follows:—

"It is not our purpose to become affiliated with any other body, nor is it intended that we concern ourselves with labour troubles or political influences.

"Our main objectives are (a) that the licensed aircraft engineer shall have a truly representative body, concerning itself to matters solely connected with him in the performance of his duties; (b) that that body be constituted in such a way as to warrant recognition as a responsible entity by all concerned with the good name of the aircraft industry; (c) to maintain amicable relations between employer and employee, and, to this end, further a necessity for the proper appreciation of the loss or responsibility attaching to both; and (d) in cases of any condition warranting notice by the Association, to provide prompt investigation as an independent body.

"Further, it is intended to provide a technical information bureau and an employment bureau, and opportunities for the interchange of ideas and experiences by means of a monthly publication and area dinners."

Capt. Paterson (4, High Street, Brentford, Middlesex) is, as already stated, the hon. secretary and treasurer, and Mr. L. T. Bain, of British Airways, is the chairman of the newly appointed executive committee.

Death of Sqn. Ldr. D. E. Stodart

THE death, at the age of 56, of Sqn. Ldr. David Edmund Stodart, D.S.O., D.F.C., breaks another link with the early days of flying. His career was curious, for he first qualified as a doctor, and then became a combatant officer. He learnt to fly in 1912 at the W. H. Ewen School at Hendon. His R.Ae.C. certificate bore the number 321, dated October 15, 1912. He used to race at Hendon under the name of Dr. Edmund. In 1914 he joined the R.F.C. and was stationed at Netheravon. In the Great War he distinguished himself, as his decorations testify. By 1917 he had risen to the rank of Major, and at the battles of Arras he commanded No. 3 Squadron, which was equipped with Morane Parasols.

After the war, he was given a permanent commission in the R.A.F., and served in India, Egypt and Palestine. Among other appointments he commanded No. 84 (Bomber) Squadron at Shaibah in Iraq. In 1931 he retired from the Service and reverted to his old profession of medicine, becoming assistant physician in the dermatology department of Middlesex Hospital.

In 1934 he entered for the Mildenhall-Melbourne race, having as co-pilot his nephew, F/O. K. G. Stodart. They flew an Airspeed Courier, and arrived at Melbourne sixth in the handicap race.

PRIVATE FLYING

THE NEW FAIRCHILD: One of the first — if not the first — private machines to land at the new St. Moritz landing ground was a Fairchild 24 brought over by Herr Kronfeld. The 1938 version of this machine, for which M. Antoine Gazda is offering concessions in this country, is a full four-seater with ample luggage accommodation.

Topics of the Day

Just Details

NOWADAYS we have not so very much to complain about in the matter of aircraft fittings and furnishings, though they are, nevertheless, quite often inferior to those of the most inexpensive cars. It is not many years since we were accustomed to the idea of sitting on an extremely hard cushion inside a curiously shaped little tub surrounded by very bare pieces of wood and equally bare pieces of wire, and with a few oddly disposed instruments ready to butt one on the chin after the slightest impact against the ground. Only one's head, sticking ridiculously out of a hole cut in the top of the fuselage, remained in comparatively civilised surroundings.

Except in the case of very small and very inexpensive aeroplanes, or those used exclusively for training, all that is now a thing of the past. But let it be said that control levers are still such that ungloved hands may be abraded and, in some cases, such that, following the exercise of a special muscular effort, they come off in one's hand. This, of course, does not apply to more or less essential controls such as joy-sticks, but only to occasionally used, but nevertheless essential, controls such as brake levers. At the same time many of these less essential controls are often placed in the most unreasonably awkward positions, and it is too easy on some machines to grab a handful of brake or flap lever in place of the throttle.

Most awkward of all can be the arrangement of the rudder pedal. This can sometimes be operated only with the instep and may not be fitted with any particularly simple form of adjustment. For long-period flying it is actually easier to hold the rudder one way or the other with the pedal beneath the instep and with the legs more or less rigid, but for delicate control on or in the vicinity of an aerodrome only ankle movement can do the job properly, and ankle movement is only possible when the rudder pedals lie against the balls of the feet.

Some machines, notably those of American origin, have brake pedals which are but a few inches above or below the rudder pedals, and it is necessary to slip the foot from one to the other during taxi-ing and to be extremely careful not to allow this slip to occur during the take-off or landing.

Some brake arrangements of this kind can give the pilot quite violent pains in his legs during a long practice period of concentrated take-offs and landings. In my opinion, at any rate, the brake-pedal idea—save for machines wherein the rudder is dispensed with—is an altogether wrong and dangerous principle, since the brakes are only used for a short time while on the ground, and must then be used with especial accuracy.

Vital Adjustment . . .

MY most urgent personal demand in such matters is that for a fully and immediately adjustable seat. Anyone who has flown in a trainer or Service type with such a device will appreciate its tremendous advantages. While taxi-ing, taking off, landing or making a circuit of a busy aerodrome, a pull on the lever raises the seat to such an extent that a really useful view of the surrounding air or ground may be obtained, while during a long and perhaps cold cross-country flight the seat can be lowered so that one is entirely protected and is, in fact, more or less inside the fuselage.

For cabin machines such a device is not always necessary and is certainly not always considered necessary by designers. Sometimes, too, the clearance between the top of one's head and the roof or some constructional member is not sufficiently large to make any adjustment worthwhile. Nevertheless, there are moments, particularly where side-by-side seater machines are concerned, when it is absolutely essential to raise oneself up athletically with the help of the stick and the rudder bar in order to see whether or not some stationary or mobile obstruction is looming up on the offside.

The need for instantaneous seat adjustment in cabin machines has really only appeared since the side-by-side seating arrangement became so popular. The pilot's view in such machines as the Puss Moth, Leopard Moth and Desoutter was above reproach, and the same may be said of at least one side-by-side seater in which the head room is ample and the seat, consequently, high in relation to the top of the engine cowling. Needless to say, the introduction of the inverted type of engine has made a tremendous difference to the matter of view, but we are in the way of losing this advantage in an endeavour to clean up the fuselage shape.

. . . and Vital View

WHILE on the subject of visibility—dealt with on numerous occasions in these comments—it is worth stressing the obvious fact that the whole subject is mixed up primarily with the idea of a *standardised* field of view rather than with any particularly good one. In other words, every machine, however good it may be in this respect, must necessarily have blind spots, and the only possibility of absolute safety lies in the standardisation of these spots.

From this angle, at any rate, it is fortunate that designers tend to imitate one another—or at least to follow a lead which has proved itself to be more satisfactory than others. At present the cantilever low-wing type may be said to be in vogue, and this type provides in all cases an almost identical field of useful visibility for the pilot. The differences, in fact, between one example and another are not by any means as great as those which were, and are, experienced in the case of the once conventional tractor biplane.

The advent of the pusher type may change the situation, but not so markedly as to be dangerous, since the pusher merely provides better forward visibility, with much the same range downwards and upwards and none at all

PRIVATE FLYING (CONTINUED)

to the rear. Rearward view is, in any case, not usually present with any machine except the old-fashioned tractor —and then only with the help of a sometimes severe pain in the neck.

If every pilot of every machine has an almost or quite perfect hemisphere of forward view the position is virtually identical with the possible ideal one where all aeroplanes could be made of some transparent substance. As I said, standardisation of view is far more important than its improvement.

The comparatively recent introduction of moulded material for windscreens and windows has certainly simplified the designers' problems in this matter of view, though it is still necessary, of course, that structural members should interfere to some extent with the areas over which such transparent material can be arranged.

Nevertheless, the question of rearward visibility must somehow, directly or indirectly, be tackled even in the case of the forthcoming (perhaps) pusher revival. At very few aerodromes is there a control officer who scans the skies and removes one's responsibility by giving one a take-off signal light, and in so many cases it is necessary to taxi broadside to the wind, take a quick look over the horizon, swing into wind and then open up to take-off almost immediately—and before some fast visitor lands on top of one.

A really good mirror arrangement can be of considerable assistance, and motorists have at least learnt to make use of, and to believe in, such devices. Nevertheless, it is difficult to resist the temptation to attempt to see with your own eyes rather than to trust an area of plated glass which may or may not be covering the whole of the sky at the rear of the machine.

INDICATOR.

FROM the CLUBS and SCHOOLS

LONDON

THE flying time for last week amounted to 72 hr. 55 min., which included a first solo flight by Mr. I. J. Wallace. The Hon. M. B. Paget and Mr. G. J. Ellis have become members.

BARTON (BEDS)

The school has just taken delivery of its second machine, a Gipsy I Moth, fully equipped for blind flying instruction.

C.A.S.C.

Another day of very high winds resulted in the very low flying time of 4 hours for last week-end. No flying being possible on Sunday morning, members attended a lecture on navigation given by Mr. L. V. Worsdell.

NORTHAMPTON

The annual general meeting will be held in the clubhouse on Friday, March 11, starting at 7 p.m. Future events include a dance on Friday, March 4. Flying is keeping well up to average for this time of the year.

NEWCASTLE

The first heat of the map-reading contest was won by Mr. E. Lister. The tramp party held last week was a great success and over 100 members were present. Flying was represented by 30 hr. 25 min., nearly 20 hr. of which was solo.

HERTS AND ESSEX

Although bad weather held up flying on two days, the fortnight ended February 24 produced 104 hr. 32 min. flying. Messrs. Reedtz and Dykstra have departed on a flight to Copenhagen in their newly acquired Cadet. Mr. S. J. Cooper made his first solo, and several new members were enrolled.

BORDER

Improved conditions allowed the Border Flying Club to fly 29 hr. 20 min. during the week ended February 26. Mr. N. Livingstone-Bussell completed his "A" licence tests and Mr. D. Ellis passed his altitude test. Cross-countries included trips to Sutton Bank, Newton House, Newcastle and Blackpool.

HANWORTH

The formation luncheon visit to Brooklands Club was cancelled owing to high winds last Sunday, but an effort will be made to attend the first Dawn Patrol next Sunday. The landing competition held at Aldenham aerodrome on Sunday, February 20, was won by Mr. A. H. Swann, with Mr. F. W. Broughton second and Sir Charles Wrench third. A total of 46 hr. 50 min. was spent in the air during last week.

MARSHALL'S

The flying times at Marshall's Flying School for the week ended February 27 totalled 72 hr. 40 min. A number of interesting machines visited the aerodrome, ranging from a Miles Martlett to a Bristol Blenheim Bomber. Cross-countries were flown to Hatfield and Birmingham and some blind flying was carried out by a few of the advanced pupils. Messrs. McGoun, Mackintosh and Low completed their "A" licence tests and Mr. Clews flew his first solo.

SOUTH COAST

The competition committee have obtained eight cups and trophies to be competed for this year. The first of the contests for one of these will be a pilot's height-judging competition which will take place on March 12, 1938. Landing, aerobatics, bombing and ladies' competitions will follow in due course. Mr. V. H. Munzing, who recently obtained his "A" licence, together with Mr. R. P. Stevens, a "B" licence holder, are making arrangements to fly to India in easy stages. They intend to leave about the middle of March.

YORKSHIRE

Although most of the north end of the aerodrome is at present unearthed, flying has been well up to average, and for the week ended February 25, 26 hr. 20 min. was logged. The total for the month to date is 72 hr. 35 min.

BOURNEMOUTH

An impromptu landing contest in very rough weather was won by a very creditable effort on the part of Mr. C. R. Curtis Nuthall, and a "booby" was shared by two members, one of whom missed the aerodrome altogether. There were sixteen entrants in all. Mr. P. P. Kent has completed his "A" licence tests successfully. Although there was serious interference from high winds, the total flying time for the week ended February 27 was 18 hours, and cross-country flights were made to Croydon, Hayling Island and Portsmouth.

BROOKLANDS

Although the weather was too boisterous to allow the members to try the machine for themselves on Sunday, a demonstration was given of the Avro Avian fitted with the Cowey undercarriage, and Mr. Ken Waller and Capt. Davis put it through its paces. The C.W. Cygnet will be at the club next Sunday. The list of seventeen new members looks like a page from *Who's Who*. Mr. R. H. Potts has gone solo. Three new "A" licences were issued, these being gained by Messrs. C. J. E. Jones, R. L. Fuller and F. Wenckebach. Capt. H. Duncan Davis and Mr. K. H. Waller are leaving in the s.s. *Atlantis* for the West Coast of Africa on March 26 and have generously offered to make up a party with any other club members who wish to join them in their cruise.

CINQUE PORTS

The annual dinner and dance will be held at the Grand Hotel, Folkestone, on Friday, March 11. The improvement in the weather during last week has resulted in an increase in the flying time, the total being 38 hours. Mr. David Llewellyn, the chief instructor, is now back from his Reserve training to relieve Mr. R. M. Hackney, who has been kept busy on night flying on Army Co-operation. Delivery of a new Tiger Moth should be made early in the week.

The Deauville Rally

THOSE private owners who attended the rally at Deauville last year will be glad to hear that the Aero Club of Deauville has invited our own Royal Aero Club to organise a similar rally between July 16 and 18. The invitation is extended to the pilot and one passenger in each machine, who will be the Deauville Club's guests for the week-end. The details of the programme will be announced later, but meanwhile those owners and others who are likely to wish to take part should send in their names to the Secretary of the Royal Aero Club (119, Piccadilly, W.1) as soon as possible.

Changes at Witney

WE learn that Universal Aircraft Services, Ltd., of Witney Aerodrome, Oxon, have now been taken over by Mrs. B. S. Macdonald and Mr. E. B. Taylor, who will, as before, run the company largely as a training school for "B" pilots, ground engineers and radio operators. Repair work and C. of A. overhauls will, of course, be undertaken.

The new staff consists of Mr. Denis Cowan, previously with Foster, Wikner Aircraft and at Bournemouth aerodrome, who will act as manager; Mr. H. C. Russell, who will be the navigation and wireless instructor; and Mr. T. S. Lofthouse, assisted by Mr. T. H. Martin, as engineering instructor.

"OUTSIZE" FASHIONS from FRANCE

Advance Information on Some Real "Giant Air-liners": Double-Decker Landplanes and Flying Boats

WE are entering on an era of great aeroplanes—landplanes for transcontinental flying and even larger flying boats for long ocean crossings. France, with characteristic courage, has projected a number of such aircraft, certain of which will overshadow in size even the 80,000 lb. so-called "Double Empire" boat of Short Bros., the all-but-completed effort on similar lines by Boeing, and the resuscitated giant Latécoère *Lieutenant de Vaisseau Paris*.

There are two landplane projects which seem to be under such serious consideration as to warrant a brief description. These are the Air-Wibault 670 and the Breguet 760.

The Wibault design is a four-engined "low-mid-wing" cantilever monoplane designed for four 1,600 h.p. Gnome Rhone P.18 two-row eighteen-cylinder radials which are cantilevered out from the wing, the two central units projecting forward of the outboard pair. Great pains were taken in the design to ensure the latitude in matters of equipment and tankage which would be demanded by such a company as Air France, who might require to operate machines of the same type on long transcontinental services and on short trips such as London-Paris. Thus, accommodation can be provided for 66 passengers for "short haul" work, while with tankage for a range of 1,500-odd miles, seats, convertible into couches, will be provided for twenty-six. Paris-Saigon in 48 hours is visualised with the latter equipment.

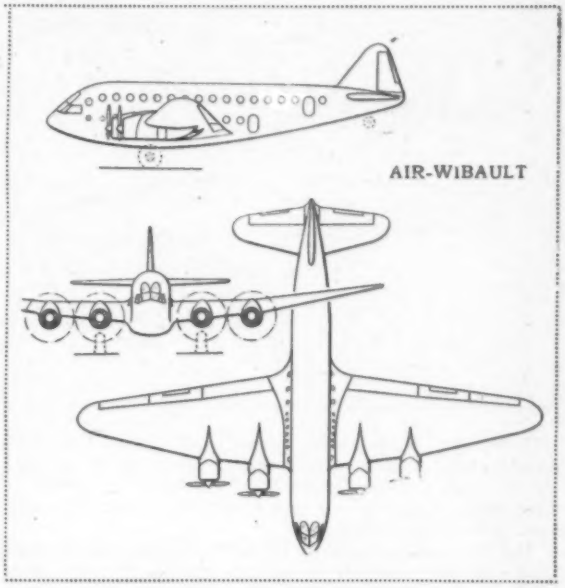
A Restaurant

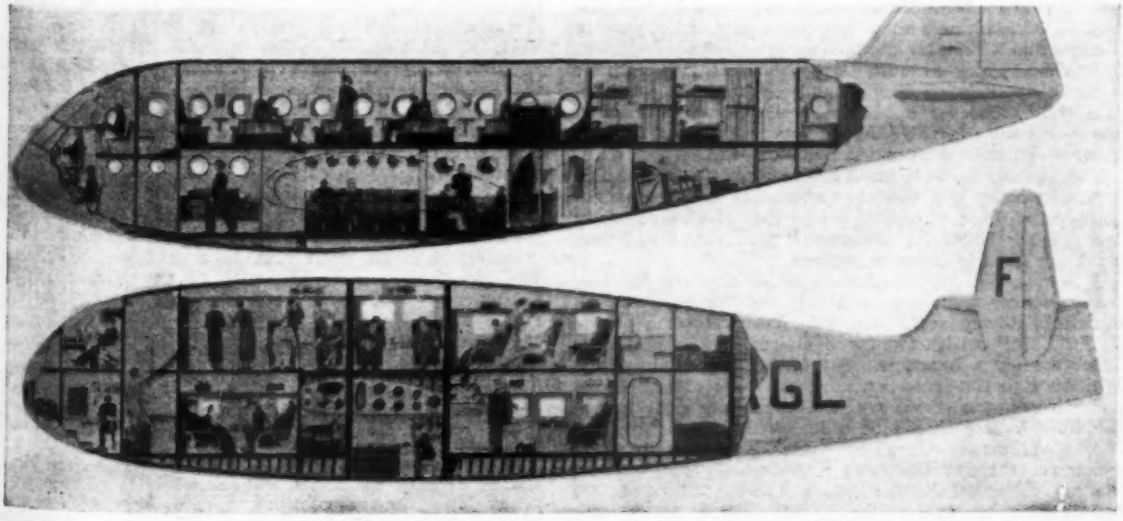
There are two decks, passengers normally being allotted the upper one, though in the long-distance version a restaurant seating sixteen is built into the lower deck. A smoking room and a bar are also specified. As at present visualised the crew will number seven. Despite the great capacity of the fuselage the span, at something like 110ft., is comparatively small. The all-up weight is estimated at 56,216 lb.

The projected Breguet is very similar to the Wibault so far as fuselage arrangements are concerned, though due to the lower power (4×1,000 h.p.) "only" 56 passengers will be accommodated. There is some talk of a trans-atlantic flying boat on somewhat similar lines.

Perhaps the most impressive of the proposed flying boats is the Latécoère 631, a six-engined monster with retractable outboard floats. The high cantilever wing is tremendously thick where it meets the hull, but the taper, both in plan and thickness, is very pronounced. Of fine aerodynamic form, the two-step hull extends for an astonishing distance forward of the wing, the pilot's cockpit being many yards aft of the bows.

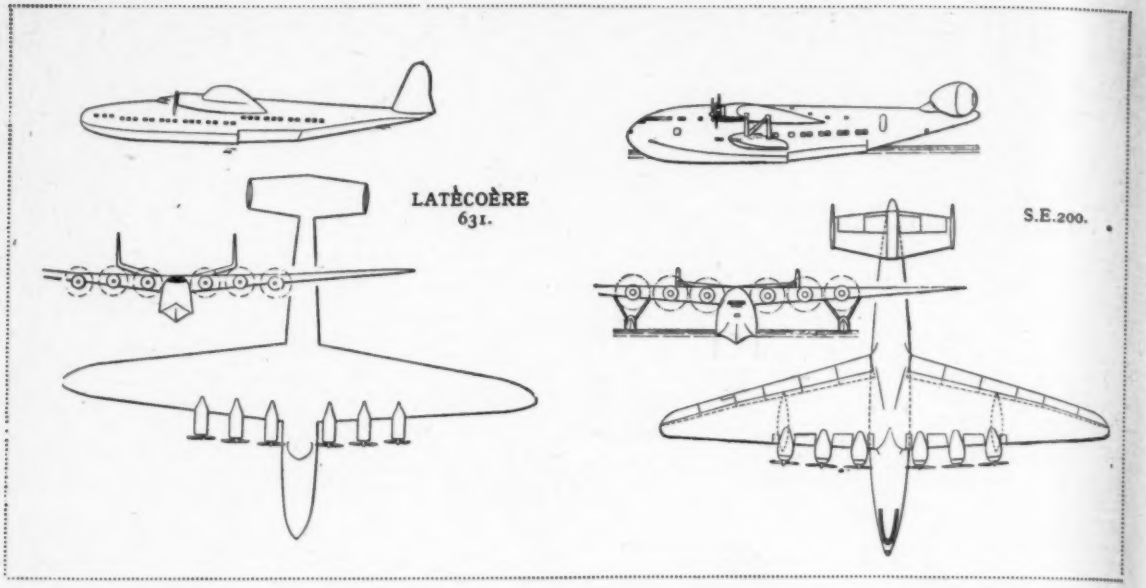
The six engines are Gnome Rhone P.18s, delivering 1,650 h.p. each for take-off. A characteristic feature is the lowering of the outboard engine nacelles which accommodate in their tail fairings the hydraulically retracted floats. The engines are accessible in the air and it is estimated that flight should be possible with two of them out of action.





Two approaches to the "double-decker" problem: The Air-Wibault (top), and the Breguet 760.

Boeing & Sons



Data are: Span 187ft. (about 25ft. more than the *Lieutenant*), weight empty 53,350 lb., all-up weight 131,359 lb., gross weight in "overload" condition 145,000 lb., top speed 260 m.p.h., cruising speed at 70 per cent. power 217 m.p.h.

The new combination of Lioré et Olivier and Romano (S.N.C.A. de Sud-Est) is working on the S.E.200 (late LeO 49), another six-engined model (Gnome Rhone P.18) with conventional outboard floats and a hull reminiscent of the Short Empire boat. Figures are: Wing area, 3,552 sq. ft.; weight empty (without equipment), 57,760 lb.; all-up weight, 134,920 lb. As in the case of the Latécoère 631, a 10 per cent. overload is permissible.

Intended for similar work the C.A.M.S. 161, now under construction, will be fitted with six engines of lower power —liquid-cooled Hispano Suiza 12 Ydrs, delivering a total of 5,520 h.p. at 1,500m. Wing floats are retractable as in the Latécoère, the long tail fairings extending for some distance behind the wing. In essentials the wing resembles a scaled-up version of that on the new C.A.M.S. 141 military flying boat which has just been launched. The 141 has four Hispano Ys and a modicum of strut bracing.

Not the least interesting feature of the 161 will be the radiator system: in addition to surface cooling employed for cruising there will be retractable radiators for use at take-off.

Data relating to the C.A.M.S. 161 are: Span, 151ft.; wing area, 290 sq. ft.; weight empty, 41,667 lb.; all-up weight, 81,570 lb.; top speed (at 1,500m.), 220 m.p.h.; cruising speed (at 4,000m.), 186 m.p.h.

A point of particular interest concerning the development of these huge machines is that, in many cases, large-scale models are made, not only for the wind tunnel, but for actual flight tests. The C.A.M.S. concern have a model of the 161 fitted with six Train engines of 60 h.p. apiece. A pilot and observer are carried on test flights.

A CROP OF BRITISH PROTOTYPES

THIS week it becomes permissible to refer to certain new prototype Service aircraft now under construction or on test. Prominent among these are two new *ab initio* trainers of entirely new design and of wooden construction. Built by the Heston Aircraft Co., Ltd., and Phillips and Powis Aircraft, Ltd., these machines meet Air Ministry Specification T.1/37, and it is reasonable to suppose that whichever is chosen for large-scale production will eventually supersede the three types of initial training machines at present in service with the R.A.F.

The Heston Aircraft machine, two examples of which are being built, is a tandem two-seater, low-wing monoplane with a D.H. Gipsyqueen I engine, which is virtually a Gipsy Six Series II. In general layout and in power plant the Miles machine is similar.

A new version of the Armstrong Whitworth Whitley heavy bomber monoplane is listed—the Whitley IV, with two Rolls-Royce Merlin engines. These may be of the Merlin X series with two-speed blower, power figures for which are given hereafter. In view of the fact that the Whitley with two-speed-supercharged Tiger VIIIs of lower power is estimated to do 215 m.p.h., the performance with the Rolls-Royces should be quite outstanding.

Among the new engines is a Kestrel Special, details of which are not available, and a moderately supercharged Merlin, designated the Merlin M.S. The latest type of fully supercharged Merlin is the Merlin III. Figures for the new two-speed-supercharged model previously mentioned are: 1,000/1,040 h.p. at 2,500ft., and 925/965 h.p. at 13,250ft.

Recent Bristol types include three experimental Hercules —H.E. (1SM) (two-speed supercharger), H.E. (4M) (moderately supercharged), and H.E. (5M) (moderately supercharged). Perseus models are the Pr.E (1S), VI, VIII, X, XI and XII. The Series VI is rated at 715/745 h.p. at 6,500ft., the VIII at 645/670 at 5,000ft., and the XII at 715/745 h.p. at 6,500ft. All except the Perseus X are moderately supercharged. Apart from the Pegasus XVII and XVIII, which are already familiar, there are the P.E. (6S) and the Pegasus XIV and XV (fully supercharged).

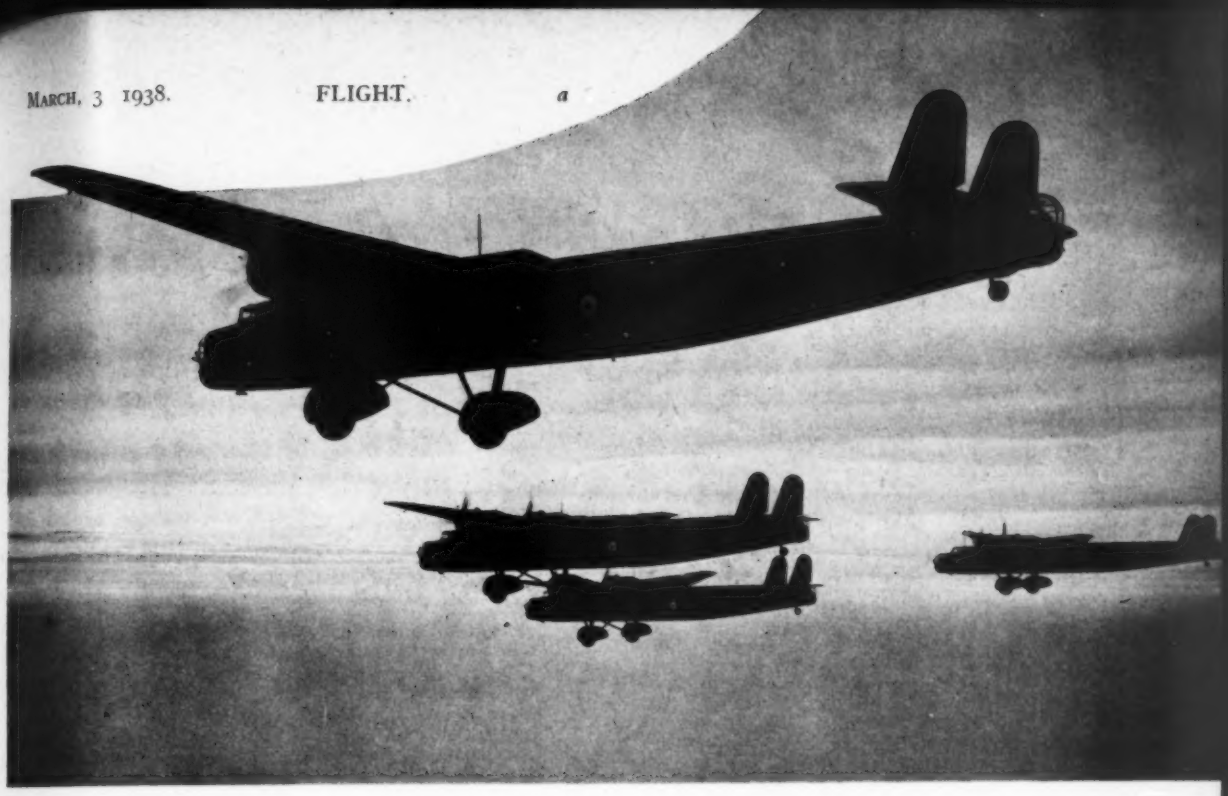
The Napier Dagger engine previously known as the E.108, is now designated the Dagger VIII. Engines of this type are being installed in Hereford bombers now under construction in the Short and Harland factory at Belfast. The Hereford is a development of the Handley Page Hampden.

A Hamble Send-off

IF the future warmth of a Mess depends upon the success of the house-warming party, the brand-new Mess of Air Service Training, Ltd., at Hamble, threatens to be stifling.

That was the thought of one of the many who enjoyed the inaugural dance last Friday.

Group Capt. R. F. J. Barton, the Commandant, and Mrs. Barton, received the guests, most of whom found an opportunity during the evening of inspecting the new building, and in many cases of trying the billiards and ping-pong tables. The fine entrance hall, large dining room (and, incidentally, the excellent buffet) were duly appreciated.



R.A.F. Units Visited

No. 214 (BOMBER) SQUADRON

By MAJOR F. A. de V. ROBERTSON, V.D.

(Illustrated with "Flight" Photographs)

A HIGH-WING monoplane is always a joy to behold. Mechanical contrivances are not primarily concerned with beauty of line or imitations of the graces of Nature; stark efficiency is their ideal. So the white sails of Nelson's three-deckers have given place to the grim battleships of steel. The human eye is, however, adaptable, and those who have never seen H.M.S. *Victory* with all her sails set can find a grandeur amounting to beauty in H.M.S. *Hood*. Likewise the low-wing monoplane now finds its admirers, though it has no link with Nature, and none can deny the graces of, say, the D.H. Albatross. But when one does come across a high-wing monoplane the resemblance to Nature's creatures of the air, the birds and insects, immediately strikes some chord in the human make-up, and the mind begins to seek after similes. So, as the car containing *Flight's* representatives drove round the circuitous roads which lead to the main entrance of Feltwell aerodrome, the sight of the Harrows taking off made one think: "A monstrous eagle! a giant dragonfly! a—what is it? Anyway, it is Nature and Science working in unison."

Feltwell is near Brandon, in Suffolk, and is one of the oldest of the new aerodromes. That is to say, its buildings are of raw red brick, but they are finished, habitable, and inhabited. The purlieus are not yet gay with beds of flowers and trim lawns of shaven grass, but at least they do not resemble (as the approaches of some new R.A.F. stations do) a severely shelled trench system. The aerodrome itself comprises a goodly slice of East Anglia, and is one of the largest in the country.

How lucky England is in having a huge, flat plain running up so much of her East Coast! It is an ideal tract for laying out aerodromes, where heavy bombers can disport themselves like children at play in a nursery, and yet it is near enough to the starting point for real business if ever the need should arise.

"Ah!" somebody will say, "but the East Coast is also within easy reach of enemy bombers." It may be so, but what will the enemy do when he finds himself wandering above that great flat plain? When King George V went to Duxford to review the massed fly-past of many R.A.F. squadrons, the staff had a tricky job to marshal them all in the air. They had smudge fires lit as marking points for the various formations, because, they said, the country was so featureless. And that was by day and in fine weather. It would be no easier to find a given point in East Anglia by night, and probably a cloudy night. However highly trained the enemy navigators might be, they could hardly count on greater accuracy than was to be expected of pilots who lived in that country.

Two squadrons live at Feltwell, Nos. 214 and 37 B.S., both equipped with Harrows. No. 214 was the first squadron in the Service to have that type of heavy bomber. No. 37 is an offshoot of No. 214, for it was formed in April last out of a nucleus of officers and airmen drawn from B. Flight of No. 214. The latter was itself formed from a flight of No. 9 B.S., that peripatetic squadron which *Flight* met some years ago at Boscombe Down, which paid a somewhat brief visit to Aldergrove, in Ulster, and which is now settled at Scampton, in Lincolnshire. Of course, No. 214 inherits the honours and traditions of the old No. 14 Squadron, R.N.A.S., of which more anon. It is interesting to note that the squadron has a long connection with Handley Page heavy bombers, for during the War No. 14 (Naval) flew the 0/400 type at

The C.O. of No. 214 (B.) Squadron: Wing Cdr. O. C. Bryson, M.C., D.F.C., A.M.

Dunkirk, while the squadron now flies the Harrow.

The reforming commenced when No. 9 B.S. was at Boscombe Down, and the exact date was September 16, 1935. The embryo No. 214 was first equipped with five Virginias, and still speaks with respect of the sterling qualities of that time-honoured bomber. Two months later it moved to Andover, and on October 1, 1936, to Scampton. That was the period when the hurry-scurry of expansion enforced a game of general post with old and new squadrons. On April 12 of last year No. 214 moved once again, this time to its present station of Feltwell. By that time it was the proud possessor of Harrows, which became its standard equipment on April 12 last.

Equipment

The squadron is organised in two flights, and its initial equipment is sixteen machines. Most of these are now of the Mark II variety, though some of the Mark I category may still be seen. The Mark I has the Pegasus X (two of it, of course), and the Mark II has the Pegasus XX. Externally, the difference seems to be that the goldfish bowls in the nose and tail have no fish in them in the Mark I, while in the Mark II the bowls are fully stocked. A light-hearted young pilot explained that the authorities evidently expected some of the first Harrows to get a bit bent, and did not want expensive articles of machinery to be smashed up as well. As a matter of fact, the Harrow is so easy to fly, and the training given at the Flying Training Schools is so good, that crashes and damage have been extremely rare in No. 214 B.S. There are, as yet, very few twin-engined types at the F.T. Schools, and young pilots arriving at the squadron have to be put through a course of dual before they can be entrusted with the care of a Harrow. It has been found that on an average only three and a half hours' dual has been necessary. The pilot's seat is some sixteen feet above the "bottom" of the wheels, and one would imagine that it would take a good deal of calculation and experience to put those wheels down neatly on the grass; but the view is very good from the pilot's seat, and in practice no great difficulty has been found in learning to land the Harrow. During *Flight's* visit to Feltwell many landings were seen, and all were exemplary. The more experienced pilots land the machine at about 70 m.p.h., though the newest arrivals may find that a little extra speed makes for confidence. The top speed of the Harrow at 10,000ft. is round about 200 m.p.h., one machine varying slightly from another. It cruises comfortably at 185 m.p.h., and its range and load are—shall we say, satisfactory? It is not to be conceived that any foe of Britain would heartily desire a series of visits from squadrons of Harrows on business bent.

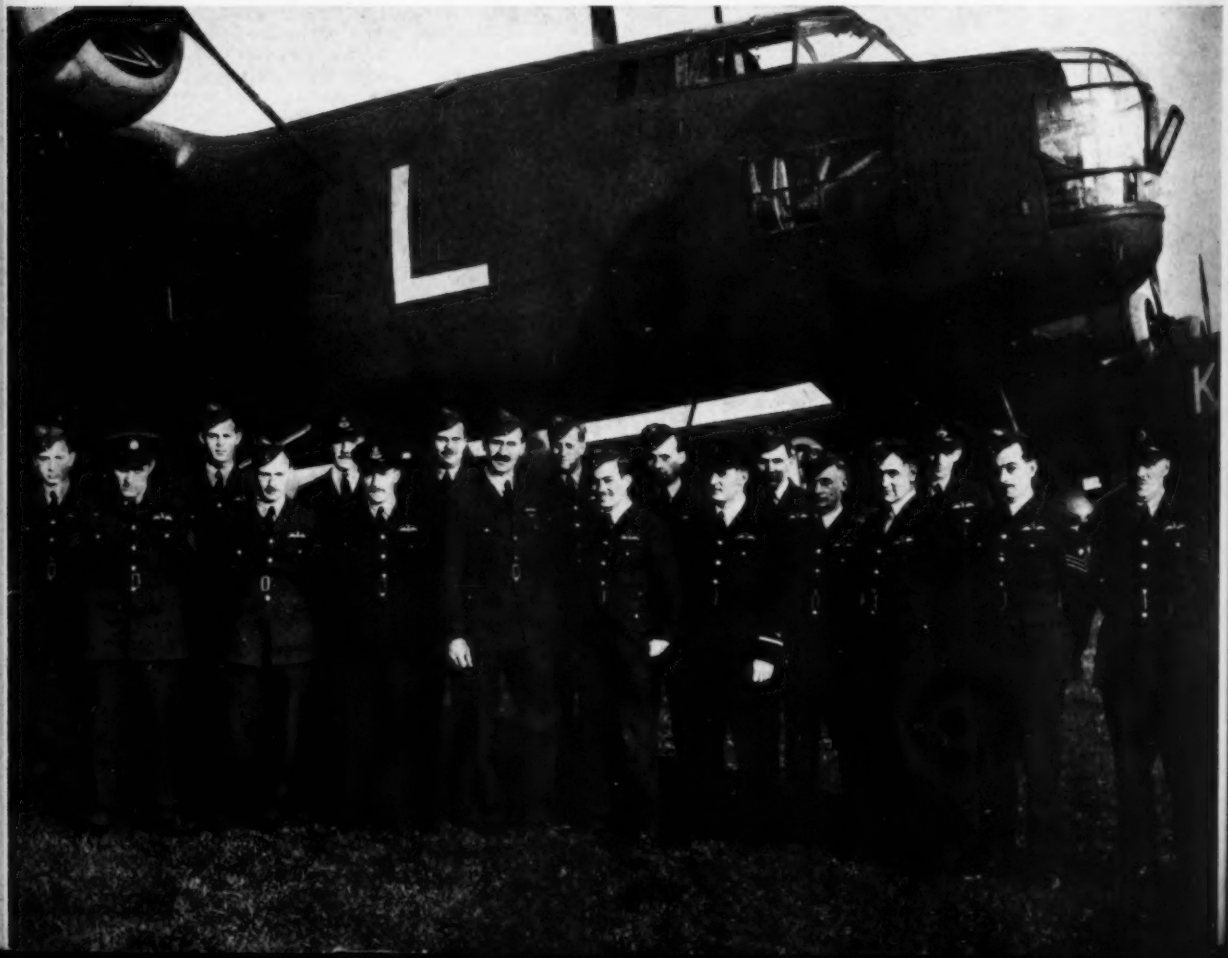
All squadrons which are numbered from 200 upwards have a naval ancestry. No. 214 had as its origin the Dunkirk Command of the Dover Patrol. At Dunkirk there was the Fifth Wing, R.N.A.S., and from the personnel of this Wing there was formed first No. 7 (Naval) Squadron, and in July, 1917, this squadron gave birth to an offspring known first as No. 7A Squadron. In December of the same year the latter was transformed into No. 14 (Naval) Squadron. From then to the end of the War the history of the squadron is continuous.

War History

It was in March, 1917, that No. 5 Wing surrendered, without any regret, its assortment of twin-engined Caudrons, Sopwith 1½-Strutters, and Short bombers, on receipt of about fifteen Handley Page 0/100 machines with Rolls-Royce Eagle engines. Later these were replaced by the 0/400 type. The pilots had had a pretty rough time on the old machines, and they welcomed the Handley Pages with enthusiasm. The night-bombing squadrons were formed, and night bombing became a very popular pastime.

(*Continued after photogravure section.*)

Some pilots of No. 214 (Bomber) Squadron (left to right): P/O. J. B. Murray; Sgt. Sach; P/O. F. L. H. Eddison; Sgt. Styles; P/O. C. L. Gilbert; P/O. K. W. Kaufmann; P/O. H. W. Poultney; Sqn Ldr. H. A. Constantine; P/O. P. C. Pickard; P/O. J. M. Griffith-Jones; P/O. E. J. Carter; F/O. R. E. Dupont; P/O. H. E. Bufton; P/O. L. M. Craigie-Halkett; F/O. B. D. Sellick; P/O. R. C. Simmons; Flt. sgt. Blake; Sgt. Duffy.



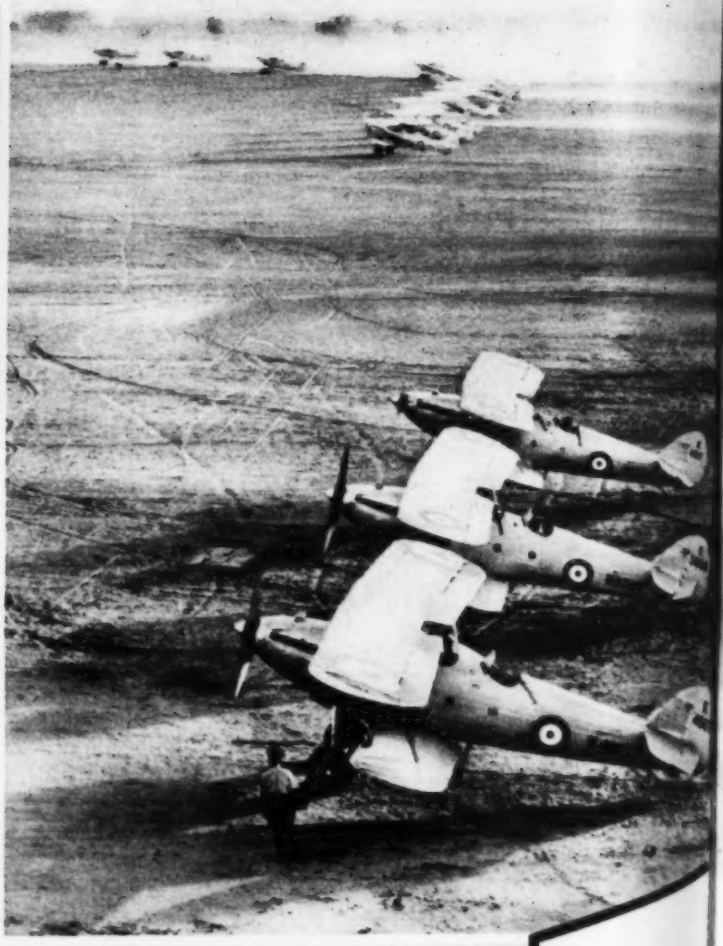
No. 214 AT WORK

A vivid impression, by *Flight's* photographer, of the crew of one of the Handley Page Harrow heavy bombers of No. 214 (Bomber) Squadron, whose work is described in the article opposite. The second pilot has left his seat to check navigation at the chart table; the head of the first pilot can just be seen above the fuselage cross-member. Seated on the left is the radio operator.

HB-IS1
SWISS AIR

SKI-LINER

Winter sports enthusiasts can now reach the St. Moritz playgrounds by means of Swissair's new "on demand" fine-weather service from London to Samaden, the 5,000 ft. aerodrome adjoining the famous resort. This fine photograph shows the Douglas D.C.2 amid some of the most striking scenery of the Engadine, while inset on the left is a view of St. Moritz itself, taken by a member of the staff of *Flight* from the D.C.2 as it circled the town.



OUT EAST

To many Service pilots trained there these pictures will recall memories. They show pupils under instruction at No. 4 F.T.S., Abu Sueir, Egypt, the only Royal Air Force flying school overseas. The aerodrome, which is pure desert, is surrounded at various distances by other landing grounds, to which pupils fly daily for instruction. On the right a line of Hart Trainers is seen taking off at sunrise for one of these grounds.

No. 214 (B.) Squadron's H.P. Harrows demonstrate echelon, stepped up — an unusual formation for heavy bombers.

At first, the Wing's Handley Pages were used for anti-submarine patrols, and on one of the first of these patrols a Handley Page sank an enemy destroyer off Zeebrugge. That was a great score. The enemy, however, was stirred up by this loss, and shortly afterwards a German single-seater seaplane avenged the destroyer by shooting down the victorious Handley Page. The heavy machines were then turned on to night bombing exclusively, but the defences of Ostend, Zeebrugge, and Bruges were strengthened, and after a while our machines seldom came back from raids over these towns without bullet holes in them somewhere. Then the enemy used to send bombers to raid Dunkirk aerodrome as the Handley Pages were coming home, and sometimes the latter had to land on the beach. Later on a German seaplane used to come down and sit on the water just off the beach and wait for the returning Handley Pages. When they came the pilot would take off and attack them. In one night this German bagged two F.E.s and shot a Handley Page about badly.

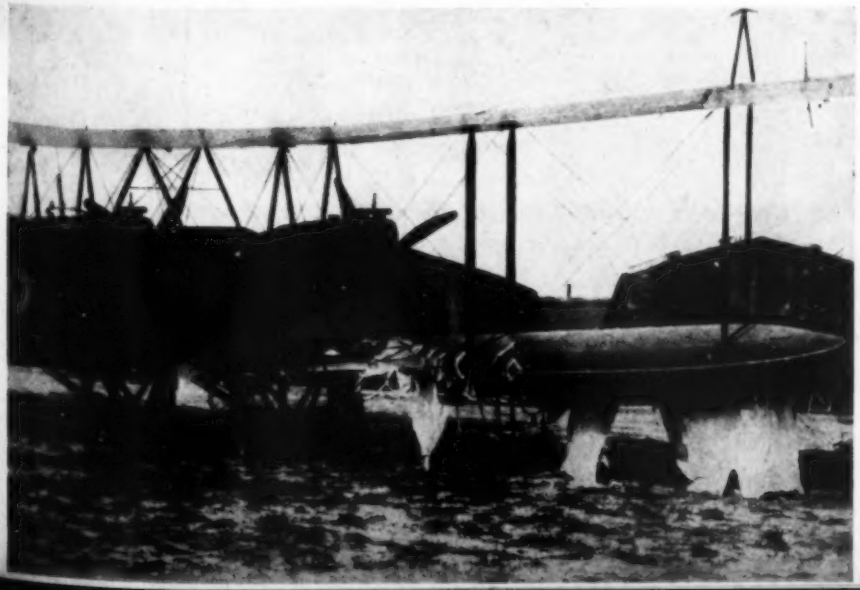
The popularity of the Handley Page is easy to understand. The engines were reliable, for one thing, and during the War that was a very great and not too common a thing. Then each machine could carry a bomb load of from 1,344 to 1,793 lb. The same load carried by D.H.4s would have required six machines. The actual saving in petrol was worth-while, though economy of petrol was not much regarded during the War.

The accuracy of their bombing was a point on which No. 7 and No. 14 took justifiable pride. It must be remembered that the towns which they had to attack were all in Belgium, and were peopled by our Allies. The inhabitants suffered much from being under enemy rule, and it would have been just too much if they had suffered as well from the bombs of their friends. The docks at Bruges are right on the edge of the town, but though they were bombed incessantly, very little damage was done to the town by the night bombers.

The bombing, however, was not always carried out scathelessly. One rainy and stormy December night a pilot was returning from a successful raid upon the Bruges docks, and when he got near the aerodrome he could not see the ground. He came down, however, and landed much too fast, uprooted three small trees, and turned the machine right over on its back. They were on the wrong side of a canal, and both pilot and observer were pinned under the wreckage, and the pilot's head was held against the ground by one of the engines. Petrol poured all over them, but, fortunately, no fire broke out. For some time the aerodrome men could not find the wreck in the darkness, and when they did several men swam the canal, but could not raise the tail of the heavy machine without further help. It was nearly an hour before enough men reached it to be able to lift it, and then they had to be very careful not to let the engine crush the pilot's head. Ultimately both were rescued and were little the worse for their adventure.

In March, 1918, the Germans began their last great offensive, and the Army begged the Navy for air help. Nos. 7 and 14 Squadrons were ordered to bomb the railway station at Valenciennes for all they were worth, so as to interrupt the flow of reinforcements reaching the German fighting line. On the night of March 26-27 ten Handley Pages set out on this mission. Three failed to find the target, but bombed other railway stations, and twelve 112 lb. bombs went down into the congested station of Tournai. The other seven machines let go four 250 lb. bombs and seventy-six 112-pounders on to the packed station at Valenciennes. No doubt that meant some relief to the hard-pressed British infantry.

During March personnel were taken from Nos. 7 and 14 Squadrons to form No. 15 Squadron (now No. 215 Bomber Squadron stationed at Driffield). On April 1 the Royal Air Force came into being, and the figure 200 was



R.A.F. Official Photograph, Crown Copyright.

A war-time memory of No. 214 Squadron, or, as it was then, No. 5 Wing, R.N.A.S., later divided into No. 7 and No. 14 Squadrons. The picture shows a 0/400 Handley Page safely home after being "winged" by anti-aircraft fire.

Harrows of No. 214 (B.) Squadron take off in formation from the smooth turf of Feltwell.

prefixed to the numbers of all R.N.A.S. squadrons. But the Germans were advancing so fast that there was talk of partially evacuating the country between the lines and the Channel ports. Nos. 207 and 215 Squadrons were actually sent back to England, but they left their Handley Pages behind, some of them being handed over to No. 214, while others went to the Independent Air Force.

While the Army was still struggling, though with increased confidence, the Navy took the initiative by the attempt to block the Zeebrugge canal on St. George's Day, April 23. The weather would not allow aircraft to take part in that gallant action. But after it was over the Bruges docks were seen to be crammed full of U-boats, which evidently could not get away. Vice-Admiral Sir Roger Keyes begged and implored that they should be bombed out of existence, especially as the Army was now through the worst of its ordeal, but Sir Douglas Haig was still loath to spare any long-range bombers. Nevertheless, No. 214 was told to do something in the matter.

Assisting a Block-ship

The next big event was the attempt to block Ostend harbour by sinking the *Vindictive* in its mouth on the night of May 9-10. This time No. 214 took an active share in the fight. The squadron had seven Handley Pages ready in the air waiting for the monitors to open fire, which was to be the signal. The first shot was fired at 1.43 a.m., and at once the Handley Pages started bombing the German batteries. They kept it up for three-quarters of an hour, and dropped altogether six 550 lb., fifty-three 112 lb., and twenty-six 25 lb. bombs. Then at 2 a.m. they started dropping flares at intervals to help the men who were sinking the *Vindictive*. It was a great pity that so gallant an action should not have had a better result. So far the part of the aeroplanes had been easy, but as they left the scene of action fog came up, and four of them had to land away from their aerodrome.

Sir Roger Keyes continued his demands for regular bombing of Bruges, and the Air Ministry instructed No. 214 Squadron to carry this out. The Vice-Admiral pointed out, however, that at that time that squadron had only six serviceable machines. After a while the Air Ministry placed the squadron under the orders of Sir Roger, and it was presently brought up to strength. Then the Germans in Bruges began to have a bad time. On May 28 Capt. C. H. Darley, of No. 214, glided in over Bruges from the sea with engines silent and dropped three 520 lb. bombs on the locks. Two fell into one lock, and the third exploded close to the north gate of the lock. Two nights later a Handley Page of the squadron attacked La Brugeoise works and exploded an ammunition dump which was close beside them.

As the summer went on the tide turned, and the Allies began their victorious advance. The submarine menace was also pretty well in hand by that time, and the Navy had not the same urgent need of heavy bombers. So when it was found that the Belgian Army was short of aircraft Sir Roger Keyes placed at King Albert's disposal the whole of No. 5 Group, R.A.F., which included No. 214 Squadron. Only those who have taken part in a victory after years of terrible struggle can understand the feelings of the men who pushed on after the retreating foe. No. 214 Squadron played its part, and one of the last efforts recorded of it was to drop a 1,650 lb. bomb on the sidings at Melle station after dark. An ammunition train was exploded, and the damage done must have been terrific.

Less than a month before the Armistice No. 214 Squadron had the honour of carrying King Albert and Queen Elizabeth with the King's staff over the Ostend district as soon as it had been evacuated by the enemy.

During the whole of its time at the front the squadron lost only five machines on the enemy's side of the lines. Two of these were shot down and the crews killed, while the others landed and most of the crews survived as prisoners of war. The following honours were won by the squadron: five Distinguished Service Crosses and two bars to the D.S.C.; eight Distinguished Flying Crosses; six Distinguished Service Medals; three Distinguished Flying Medals; four Meritorious Service Medals; one officer was made a Member of the Order of the British Empire; eighteen Mentions in Despatches; and two Croix de Guerre avec Palme.

FLYING PURSERS

FLIGHT not infrequently receives enquiries from young people of both sexes anxious to secure jobs as airline stewards or "air hostesses." With the increase in size of passenger aircraft, other such auxiliary posts have come into existence; an example is that of "flight clerk."

Imperial Airways have recently taken on a number of men for this duty on the Empire flying boats. According to Imperials, a good many flight clerks are recruited from the mercantile marine—young men, for example, who have held posts as assistant pursers in ships. Others join from various occupations. Among a recent batch one had been a receptionist at an hotel. Others come from widely differing commercial fields.

Before starting their duties, the flight clerks enter a special training school operated by Imperials. During this period they hear lectures from experts on various aspects of air transport, the subjects including air law, types of traffic carried, and the organisation and operation of commercial airlines. In addition to attending such lectures and classes, the clerks pass through various departments of the company.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

BROADSIDE FIRE

I NOTICE that, in your issue of February 17, in the course of an article on two-seater fighters, the author makes the statement that "any hope of broadside fire seems more assuredly doomed as speed increases—in other words, the question of broadside fire is affected by the high speeds now attained, as was explained in a note a few weeks ago . . . on the 'Cazaux effect.'"

In the issue of January 6 the following statement appears:—"On the Continent the problem came into prominence during firing trials from the French *multiplace de combat* machines at Cazaux, the proving ground of French aircraft. It was discovered that, although some most impressive arcs of fire were obtainable on paper, the deflection of bullets fired broadside detracted very seriously from their fighting value."

I put it to you, as counsel would say, that the story of *L'effet de Cazaux* is a myth. As, however, this statement appears in your paper as one of fact, and has also been made by Gen. Golovine and his anonymous collaborator, I would particularly invite those who are responsible for publishing these statements to furnish the following information:—

(1) When and where has an authentic account of the Cazaux experiments been published?
(2) When did the experiments take place?
(3) What aircraft were used, and what was the speed of the aircraft from which the firing took place?
(4) What type of target was used?
(5) What arm and ammunition was employed?
(6) What was the precise nature of the effect observed?

Bridgnorth, Salop. JOHN D. NORTH.

[Frankly, the answer to Mr. North's comprehensive list of questions is that we do not know; we can give no specific answers, but only recall that when the big French *multiplace de combat* machines, originally regarded as aerial battleships, were put through their firing tests at Cazaux four or five years ago one not only read in responsible publications, but was told quite emphatically at the Paris Show, that the accuracy of their broadside fire was noticeably impaired. It may be significant that these machines are now regarded solely as bombers. Another point is that, so far as can be gathered, all the new high-speed twin-engined fighters being built on the Continent have no power-driven turrets—merely a gun with a very restricted arc of fire toward the rear.

However, Mr. North's association with the excellent Boulton Paul turrets is not to be disregarded; if anyone knows anything about broadside fire at high speeds it should be he. So we are very happy to publish his letter in the hope that someone may come forward and aid in throwing light on a subject which is tremendously important just now.—ED.]

BOMBS ON STRINGS ?

I WAS highly interested in the article in a recent issue of *Flight*, on "Bombing the Bomber." I know nothing of air fighting, but the idea looks sound to me. Why not carry the scheme a stage further and control the flight of the bomb? What I mean is, roughly, this: Suppose a fleet of enemy bombers sets out to bomb England. It flies in some sort of formation, and cross-fire from each machine is making it very hot for the interceptor fighters, so resort is made to bombing them. Flying above the enemy formation at sufficient height to be out of range of their fire, is something of the Blenheim or Hampden type, which proceeds to lower a large bomb on a cable, paid out carefully from a winch. When this bomb is nicely in among the bombers it is fired by electrical means, the lowering cable including the necessary electrical conduit.

Naturally, the pilot of the Blenheim cannot be expected to be such an expert angler as to put his bomb in position without assistance, so a colleague, flying some way astern, but near enough to watch the proceedings, instructs him by wireless: "Port a bit!" "Lower another 20 feet!" "O.K. for sound!" etc.

I don't know what the effective vertical range of a modern bomber's guns may be, but should it be sufficient to make a long length of cable necessary, too long to be practical, well, what is to stop some more planes from laying a small screen below the Blenheim? Thus, all the enemy gunners will see will be a length of cable with a bomb on one end and disappearing into the smoke at the other.

Perhaps someone will be kind enough to tell me where this idea would not work out in practice. I am only a fitter in a well-known aircraft factory, so I don't know anything about such abstruse subjects. I. L. SUMNER.

Isle of Wight.

FLYING TRAINING

THERE was a great deal of common sense in Mr. A. J. Richardson's letter (*Flight*, February 10), and the facts regarding the personnel (pilots) cannot be emphasised too much. As is generally known, at the moment the R.A.F. is not able to get sufficient men to train as pilots.

Why will not the Government financially (personally) assist those members of the general public who are prepared to take their licences and thereafter fly about 25 hours per year with one of the many flying clubs throughout the country?

At the moment we have about fifty members flying at weekends at their own expense—men who will be very useful to their country in the event of war—and who are willing (and no doubt expected by the Government) to serve their country when necessary.

Could not these men be granted, say, 20 hours each per year *free* flying with their present clubs, the cost to be met by Government funds?

The R.A.F.V.R. does not meet the requirements of these fellows, whose ages are in many cases around the 30-33 mark.

A total of 1,520 hours' accident-free flying to date is ample proof that our members should be considered useful members of the community, given some assistance, for we are not too old at 30. I. R. MASCALL, Commanding Officer,

London, W.C.2. Civil Aviation Service Corps.

A.C. IN THE AIR

IN reply to "A.F.R.Ae.S." in the correspondence columns of your issue of February 17, the suggestion contained in the writer's penultimate paragraph seems to be the solution of providing power without carrying a battery.

It is being used in the U.S.A., where a small, light power plant is carried in the aircraft to drive auxiliary generators and alternators of 10 or 20 kilowatts. The waste heat from the exhaust can be used for warming the cabins and the electric output can be arranged to give 800 and 360 cycles at 110 volts, and also direct current for such devices as will not operate off D.C. Medium-frequency alternators are designed to be self-exciting and the direct current generated for that purpose can be applied externally if necessary.

It would be very inefficient to use a converter for starting the motors. It does seem that the weighty and delicate lead battery should be abandoned. The point will soon be reached where the engine-driven D.C. dynamos will not be able to replenish the battery fast enough during night flying.

Granted that 240 volts A.C. will give an unpleasant though not fatal shock and that the insulation will have to be heavier, is not the dangerous 10,000 to 15,000 volts used for wireless?

It was not suggested that the high intensity landing-light bulbs should be operated at 240 volts, but rather at some convenient voltage with small step-down transformers and low voltage condenser to improve the power factor at 800 cycles, thus saving the weight of heavy, long D.C. cables. Incidentally, the existing heavy-filament lamps have an average life of only 100 hours.

The two motors on a twin-engined craft can each be fitted with a medium-frequency self-exciting alternator, which would include some form of governor to control the frequency. A slipping clutch has been used. On the other hand, constant-speed airscrews are coming into general use and the degree of speed control required might be quite small. During flight it would not therefore be necessary to keep the auxiliary plant running all the time.

Of recent years it has become necessary to supercharge high-tension magnetos to avoid electrical leakage at high altitudes. Using the stationary or non-rotating combination of the mercury hot cathode tube, condensers, and transformer in a sealed container to provide the high-tension, high-frequency voltage, the problem might be simplified. The timing control consists of low-voltage, small-current grid bias.

The distinct advantages of A.C. appear attractive only for a large aircraft, where the distances between the accessories and the source of power are relatively great. F. P. WILLS.

London, N.W.2.

IN BRIEF

Sqn. Ldr. E. G. Fullerton, H.Q., M.C.2, 159, Bay Street, Toronto, Ontario, is anxious to trace a unique airscrew. It was made from dog-sleigh boards at Ford Simpson in 1921, after an aeroplane of the Imperial Oil Co., on a pioneer flight into the Canadian Arctic, smashed its own when landing. It is believed that it was subsequently shown at an exhibition in England, possibly at Olympia or Wembley.

COMMERCIAL AVIATION

FOR THE PARIS RUN: The control cabin of the new Marcel Bloch 220 which is shortly to be introduced on the London-Paris-Marseilles service by Air France. The radio receiver on the right, matching the blind-flying panel on the left, is an interesting feature and it will be noticed that the windscreen layout is very similar to that of the Wibault which will be replaced.

THE WEEK AT CROYDON

Clerks Confer : Overcrowding : Dealing with the Deportee : Another Scoop for "Famous British Pilot"

WEDNESDAY and Thursday last week there was a booking conference at the Hague, where practically every European country was represented. Sixteen senior booking clerks representing twelve airlines of as many countries were present, and the conference was held under the able chairmanship of Mr. de Vries, K.L.M. foreign manager.

The great thing about this particular meeting was that there was no array of big noises, and that the Chief Booking Clerks of Europe, who do the practical work in the most complicated branch of the air travel business, got right down to brass tacks.

The points they disposed of during the working day were not so important, perhaps, but the personal contact which was established between these gentlemen of a dozen different nationalities was worth its weight in gold to air traffic. Many may disagree with me. I don't give a hoot if they do.

One day last week Capt. O. E. Armstrong, Irish Sea Airways, observed the black ball up on the mast of the Kish lightship, gunfire and the waving of a shirt or other distress signal. He radioed Dublin accordingly. I don't know what the trouble was, if any, but it just shows how useful the airlines are to shipping folk.

Stop-gap

The authorities, I hear, propose to build a new temporary hangar here, to be followed later by a permanent one. The temporary hangar will be the finest monument in the history of civil aviation to these great gods, Shilly, Shally, Shallus and Shantus.

Even though the authorities could not foresee for themselves the future expansion of civil aviation, they had warning after warning from the companies, which, of course, they answered, metaphorically, with the word "Pish!"

Now the Pishites are panicky, and Croydon is shortly to start what almost every other European airport is just about finishing.

That is not all, for years ago the authorities were warned that office accommodation was vitally necessary, but little was done except patchwork devices.

The situation is now acute, for not only are existing companies expanding and new British firms coming along all the time, but foreign national companies which have never flown to London before are expected. I hear that Czechoslovakian Air Lines will be flying through to Croydon this coming summer, and there are rumours of Italian and Polish lines. Just what happens if these people apply for offices?

One suggestion I have to make is that as the Air Ministry is responsible for this ridiculous and unnecessary shortage, those Ministry officials who occupy so many of the best rooms facing the tarmac should turn out.

A few of them are, no doubt, necessary, but the rest might be accommodated in Army tents in the public enclosure and according to their immemorial right (mentioned, I understand, in Magna Carta), hot tea could be laid on from the hotel in pipes.

Here's another scheme. Every building must, of course, have its obstruction light on top, but we have an obstruction light on top of a pylon which was really erected, so far as can be ascertained, solely to carry the light. Why not, then, combine business with pleasure (for pylon-building is a pleasurable hobby) by building a tower round the pylon and housing Government servants therein?

A top-floor flat might be reserved for whoever it is who maintains that the thing is no menace to airlines.

Turning them Round

A White Paper shows that Croydon had 36,016 foreign arrivals and 35,356 departures in 1937, and this, of course, takes no account of internal passengers.

One also learns that, altogether, 1,677 aliens were refused entry to this country at ports of disembarkation and sent back, eighty-four of them being barred at Croydon. In such cases the shipping companies have an easy job, albeit such aliens have to be carried back, whether they pay for the return journey or not. If boat deportees can't or won't pay, the company has some caboose, lazarette or glory-hole in which the alien may be placed, but in the case of an airliner there is nothing, alas! except first-class accommodation. Only the other day, one such traveller flew off the handle, gnashed his teeth, waved his arms and went bu-bu-boo-boo at the pilot, who, very naturally, refused to carry him, which decision was very heartily endorsed by the company's representative, on account of the other passengers.

What was the position then? Why, the air traffic company found that it was liable to provide and pay for a police escort to Dover, Folkestone or Harwich as the case might be, and buy the infuriated alien a boat ticket to boot! The man himself flatly refused to pay for anything, for which I don't blame him, and the authorities said, quite rightly, no doubt, "The company which imports undesirable aliens must undertake to export them."

COMMERCIAL AVIATION (CONTINUED)

Luckily, in the end, the affairs of this particular traveller were so adjusted by the authority concerned that he remained temporarily over here. Now you see why an airline manager's nightmare is of twenty inward passengers in cloaks and masks, all conspiring against someone or something, and all refused permission to land. The dream also contains a vivid picture of every machine in the opposite direction being fully booked up for a week.

Everyone knows about the eminent surgeon who removed the man's brain and substituted a rolled-up sock with a mouse in it, to give it "throb." Few know the sequel, but I am in a position to suspect—which journalistically is as good as certainty—that the man with the mouse (Lat. *Mus ridiculous*) in his brain-pan is that "famous British pilot" who is always nameless. He spends his time leading little lambkins of the daily Press up the garden path and into the ornamental pond.

Last Sunday, for example, there was the wizard yarn about the Vickers Wellesley being stolen by a foreign power. "Easy," said Britain's famous pilot, tapping a suede shoe on the brass rail and pushing an empty glass towards his gullible interlocutor. "My theory is that the men in the machine were talking to a foreign radio station when they thought they were still talking to their home operators."

Suddenly an order was given to fly east, and once well over the sea the bomber could be brought down, fished out of the water on to a boat—and the geodetic secret was ours no longer!

"It sounds," ends up the article, "fantastic. It sounds impossible. But is it true?"

When Famous British Pilot and Little Lambkin really get together nothing is fantastic or impossible. Everything is true with a capital T.

A. VIATOR.

WORSE to COME

Startling Changes in the Air Navigators' Syllabus : Some Reasons and Probable Repercussions

By C. W. MARTIN

FEBRUARY 23, 1938, will be an historical date for would-be air navigators, for on that day appeared the Air Ministry *Notice to Airmen* No. 26 of the year 1938. To the unsuspecting reader this *Notice* merely serves to draw the attention of prospective candidates for 1st and 2nd Class aircraft navigators' licences to the revised examination syllabuses (? syllabi) which have now been issued. A careful perusal of these syllabuses, however, reveals certain striking and even startling changes, due, according to an Air Ministry official, to "international requirements."

These changes, which later in this article are discussed in detail, are even more striking when it is remembered that modifications to these syllabuses have for several years been few and unimportant. Now, for example, astronomical navigation is introduced into the 2nd Class syllabus! Up to now this syllabus has been confined to D.R. (dead reckoning) navigation, but now, as one alleged wit remarked, "it is per D.R. ad astra-nomical navigation."

Harder and Harder

The navigators' examinations date back ten or eleven years, and during that time the syllabuses have remained virtually unchanged, but the standard of the examinations has gradually been raised. Some critics maintain that they have at the same time become gradually less practical. I frequently emphasise to my present students the changes that have taken place, and at the same time make them envious by telling them of the "good old days" when 35 marks were awarded in the examination for obtaining the square root of a given number by logarithms! Nowadays, as one of my students bitterly expressed it, "only five marks are awarded for calculating the time at which the moon rises in Tokyo as you cross the coast of Labrador."

The new syllabuses are, of necessity, couched in somewhat general terms, but the following notes and comments may be of assistance to any reader who is contemplating sitting for either of the examinations. To deal with the 2nd Class syllabus: The greatest changes are in Meteorology, Air Legislation and Form of the Earth. All these changes come into force on April 1, with the exception of Meteorology, which is expected to come into force on July 1.

Such regulations as provide subject matter for the examination in Air Legislation are now divided under three headings: "a," "b" and "c." A detailed knowledge is required of the regulations in list "a" (in other words the candidate must know these regulations more or less by heart). This part of the examination will be oral, and consists mostly of lights and signals, customs procedure, documents to be carried, and so on.

For the written paper, general knowledge is required of the publications in list "b" (with the exception of the regulations listed in the *Air Pilot*, which concern only Guernsey and Jersey). These publications must be in the possession of the candidate, and reference to them will be permitted during the examination for the purpose of answering the questions which will most probably cover unusual or obscure points about which a navigator would in practice refresh his memory from the appropriate publication. This is, of course, an entirely new procedure, and is due probably to the realisation by the Air Ministry that in recent years the regulations covering air navigation have increased with frequent and monotonous regularity until a study of them for examination purposes has become a real feat of memory. Such regulations have, at the same time, tended to become more complicated. For example, one of my students, after studying the new cloud flying regulations which appeared in a recent *Notice to Airmen*, expressed the view that it was "beyond human understanding" because, as he expressed it, "if you want to know at what height to fly in cloud, you take your compass course, divide it by your height, multiply the result by your airspeed and then subtract your oil pressure—unless there is an "R" in the month, when you take the square root of your revolution indicator reading."

The regulations in list "c" will also be the subject of an oral examination, and, again, reference will be permitted to the publications, but in this case the comparatively little-known books concerned will be provided by the Air Ministry.

In the Form of the Earth section it should be noted that the centesimal system of geographical co-ordinates has now been omitted. This is a practical change, since on all maps which use this system the equivalent sexagesimal system of co-ordinates also appears. Rhumb line courses and distances are now required to be calculated by means of both the Middle Latitude and the Mercatorial formulæ. Formerly candidates could use either. There is not much to criticise in this, as the Middle Latitude formula is to be preferred when the course is nearly 90 degrees or 270 degrees. This section now also includes the use of the Traverse Tables.

The most important changes in the whole syllabus are contained in the penultimate paragraph of this section. Such matters as Hour Angle, Azimuth, apparent daily motion of heavenly bodies, the stars, principal constellations and the recognition of stars and planets, are quite new, and open up a very wide field. In fact, it will not need very many additions to this section to bring in the whole of astronomical air navigation. Although at the moment it is required to find the Hour Angle of the sun only, I should not be at all surprised if an amendment is not issued at an early date to include the finding of "Hour Angles of stars and planets."

As the paragraph stands it is of little practical use. Of what use is it for a navigator to be able to recognise a certain star if he cannot calculate the Hour Angle of the star and thus obtain its Azimuth? I understand on reliable authority that in the last paragraph of this section the words "use of ephemeral tables" are intended to apply to Sunrise and Sunset, and Moonrise and Moonset tables only.

In the section known as Earth's Magnetism and Compasses, the chief additions concern the determination of deviation by

COMMERCIAL AVIATION (CONTINUED)

means of Azimuth tables, and the elementary principles of the gyroscope, causes of precession, and operation of the directional gyro. The inclusion of the first is a big step, and covers the possibility of questions involving the Azimuth of the sun at any time of the day. When the Hour Angle of the stars and planets is also included in the syllabus this section will involve finding the Azimuth of stars and planets for the purpose of checking compass deviation. The inclusion of the second was to be expected, as the directional gyro is now a compulsory instrument in certain machines.

The syllabus for signalling has been extended to include aural morse, and the international code flags. It seems strange that the latter should be included in an air navigation syllabus, especially when they are practically obsolete in the Merchant Service.

With regard to Meteorology, the most important change concerns Synoptic Meteorology. Candidates are now required "to plot the reports from a number of stations in accordance with current symbolic methods." In plain language, the candidate will have to know the appropriate meteorological codes, and will have to be able to decode synoptic messages and to plot the appropriate symbols on the charts. This will involve a considerable amount of practice, but is more or less straightforward. Far less straightforward is the insertion of simple "fronts" on a chart. This, in my opinion, is going to present great difficulties. It is possible to learn to draw isobars more or less by rule of thumb, but not the insertion of fronts. There do not appear to be any definite rules in frontology, and every "frontologist" has his own (usually obscure) methods.

These and other changes will bring the Meteorology syllabus practically up to the 1st Class navigators' standard. A new departure is the provision of reference books to enable the candidate to answer questions on Meteorological Organisation. Until *International Publication No.* 9, at present only published in French, is translated into English, it is difficult to see what reference books *can* be supplied.

It will be seen from the foregoing notes how sweeping some of the changes in the syllabus are (or can be). Those readers who have already obtained their 2nd Class navigators' licence will probably sigh with relief until they remember the fact that the Air Ministry *reserves the right to re-examine a navigator at any time.*

The changes in the 1st Class syllabus are not quite so sweeping. Probably the most important concerns the general regulations for the examination. From April 1 applications will not be considered unless he or she has held a 2nd Class licence for at least six months, and, even if the candidate passes the examination, a licence will not be issued until he has held a 2nd Class licence for not less than one year and has produced proof of having had the requisite air and navigational experience. The "navigational experience" will include the taking of at least nine astronomical observations—two by day and seven by night—and a certificate that the results have been worked out in the air.

This latter condition will, I think, prove a difficult obstacle to the average candidate because of the lack of the necessary facilities and the fact that an air sextant costs at least fifty pounds.

To my mind the greatest significance in the changes I have discussed (especially those in the 2nd Class syllabus) is not in the changes themselves but in the changes of policy involved. These changes are in some cases fundamental. There is now no great difference between the 1st and 2nd Class syllabuses, and I venture to prophesy that in the near future further changes will bring the 2nd Class syllabus up to the present standard of the 1st Class, and that the 1st Class will be raised to a higher theoretical standard. This will leave a wide gap between the standard for "B" licence examination and for the 2nd Class navigators' examination. It may not be very wide of the mark if I venture to guess that this gap will (to some extent) be closed before very long by the raising of the standard of the "B" licence examination.

Alpine

IT is understood that the negotiations which have, for the last eighteen months, been in progress between Alp Air Line, Ltd., and the British and Swiss Air Ministries, are now nearing completion, and that the company hope to establish a fast all-British service between London and Geneva as soon as the final details have been settled. Mr. F. W. Jones, formerly managing director of British Continental Airways, has joined the board of the company, which is closely associated with North Eastern Airways.

Holland and the Philippines

THE negotiations between Holland and America over the concession to K.N.I.L.M. to fly regularly to the Philippines have been resumed and show some signs of being successful, since Pan-American Airways are anxious that the gap between America and Europe should be closed. A weekly service between Manila and Batavia is to be started this year.

Another Scandinavian Service

ACCORDING to a Copenhagen correspondent of the Faroese newspaper *Dimmalaetting*, there is a possibility, this summer, of a service running three times weekly between Stavanger (Norway), Lerwick (Shetland), Thorshavn (Faroes), and Reykjavik (Iceland). Iceland's tourist traffic and Faroe's mails are the two things principally mentioned in the Faroese paper as likely to benefit.

Bloch Supersedes Clipper

AIR FRANCE'S summer time-tables will come into force on March 27, and with them the long-promised change-over from the Wibault Golden Clipper fleet to something faster and more commodious. The ten-seater Clippers, with the 1¼ hours Paris-London schedule were, for a long time, the fastest on the route, but their limited passenger capacity has been a constant handicap to Air France. New sixteen-seater Marcel Bloch 220s are to be substituted, without sacrifice of speed—in fact a great improvement, the London-Paris schedule being reduced to 75 minutes. The new machines should be ready in good time for the Easter traffic.

Another point about the new time-tables is the running of a Le Touquet service with the Golden Clippers at Easter, Whitsun, and for the whole of July and August. There will also be an Air France-Swissair pool (Paris-Zurich and Paris-Geneva), which will affect London travellers who go to Switzerland via Paris, and another pool with C.S.A. for the London-Prague service.

Trans-Canadian Start

ON Tuesday of this week the first regular flight over the Winnipeg-Vancouver section of the trans-Canadian air route was due to be made, the Lockheed Electras carrying, for the time being, mail alone. The route is via Ottawa, Toronto, and North Bay. Within a year it is hoped that the entire scheme will be in operation with a through service from Moncton, New Brunswick, to Vancouver.

France's Internal Mail Services

THE Air Bleu mail services run by the Ministry of P.T.T., which were suspended a year ago, will begin operations again this year on the following routes: Paris-Bordeaux-Mont-de Marsan-Pau, Paris-Toulouse-Perpignan and Paris-Clermont-Ferrand-Saint Etienne-Lyon-Grenoble. A daily run between Marseilles and Nice will also be made in connection with the new Paris-Marseilles air mail service.

At present, all the runs will be made by day, but the Paris-Pau route is being equipped for night-flying, and an after-dark service as far as Bordeaux will be started this month. All the routes will eventually be lighted.

Thames Airport?

SOME time ago we learnt that the idea of using an area in the Thames Estuary as an Empire flying boat base was being considered by the Air Ministry and others, but at the time there appeared to be little chance that the project would materialise, particularly as negotiations concerning the Langstone Harbour place were still in progress.

Now, it seems, there is a reasonable chance that the scheme may, after all, go through. The proposed site is the Lower Hope Reach of the Thames, to the north-east of Tilbury, and the plans include arrangements for a land airport on the adjacent Mucking Flats. This land is at present being reclaimed for other purposes, and among the advantages claimed for the entire proposal is that the approaches will be remarkably clear, and that, if the flying boat and landplane runways are dredged and/or laid out in similar directions, a single series of radio transmitters and so forth could be used for both. The distance from the centre of London is a little more than 25 miles, and there would be no difficulty in arranging a short branch line from the railway track running between Southend, Tilbury and London.

Meanwhile, the plans for the proposed Lullingstone airport are in obeyance, the Southern Railway feeling, not without reason, that theirs is not the direct responsibility of developing a scheme of almost purely public utility and value.

SECOND PARTING

How the Short-Mayo Composite Separated "In Public"

A SECOND big moment for Mr. Lankester Parker and Mr. H. L. Piper (and also, of course, for Major Mayo and all those connected with the Short-Mayo composite aircraft) passed successfully and uneventfully on Wednesday, February 23. The first—the impromptu separation of *Mercury* and *Maia*—had been accomplished on a Sunday afternoon with no critical spectators watching every move. The second occasion, before a battery of cameras and Pressmen, both flying and earthbound, demanded prearranged separation at a given position and at a low altitude.

In the original Mayo scheme parting at 10,000ft. or more is visualised, so that Wednesday's demonstration was purely a spectacular proof of the sponsors' trust in the scheme.

All eight engines, Bristols and Napiers, started without hesitation. As Mr. J. Lankester Parker taxied *Maia-Mercury* past Short Brothers' Rochester Works, accompanied in the control cabin by Capt. A. S. Wilcockson (pilot of *Caledonia* on her first and several subsequent Atlantic crossings) cine cameras began to whirr. For a moment it seemed likely that a slow-moving tug towing a cluster of barges would hold up the take-off, but before its wash had caught the less wary spectators off their guard, eight airscrews whirled into misty discs and the composite was accelerating towards the big crowd outside the works.

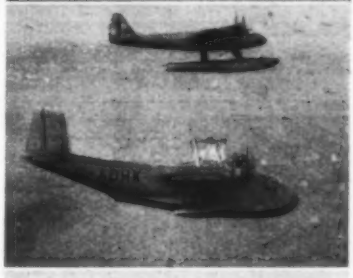
Off

After making a wide circuit with the photographer-crammed Empire boat *Corinna* in close company, the composite headed towards the works again. Then, just short of the river, and at 600-700ft., *Mercury* popped off *Maia's* back with quite astounding suddenness. One blinked and doubted one's visual impression of the previous moment. Had the now separate machines really been one? As soon as they were apart *Mercury* seemed to rise vertically, with her nose perhaps a little up, while *Maia* dropped away nose-down, neither gaining a noticeable lead until they were fully 50ft. apart, when *Mercury* went ahead.

Maia came in at once, landing elegantly and taxied away to her moorings across the water; *Mercury*, perhaps to use a little petrol, or more probably to await her turn to alight, made several rapid, low-altitude circuits at well over 200 m.p.h., with the four Rapiers whining characteristically.

Mr. Lankester Parker said that the first indication that *Mercury* was free was the loud click as the third hook released. He summed up the separation in the words "I think the chief thing we discovered was that it wasn't a fluke the first time." *Mercury's* excess lift at the moment of parting was something like 7,000lb.

These extracts from the "British Movietone" slow-motion film of the separation tell the story vividly; especially do they show the steadiness of attitude in both units after separation. These pictures are not a continuous extract; they are selected from some eight feet of film.



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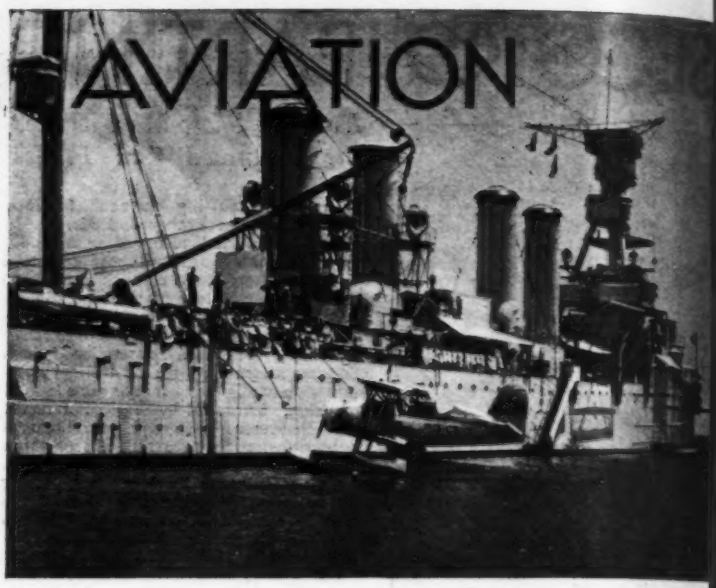
Royal Air Force and Official Announcements: Fleet Air Arm News: Military Aviation Abroad



COURTESY CALL: A Curtiss SOC-1 observation floatplane about to be taken on board the U.S. cruiser *Milwaukee* at Singapore after celebrations in connection with the opening of the new dock.

An Assistant C.A.S.

IN view of the increased responsibilities of the Department of the Chief of the Air Staff, consequent upon the expansion of the Royal Air Force, it has been decided to appoint an Assistant Chief of the Air Staff to undertake certain duties at present discharged by the Chief of the Air Staff and by the Deputy Chief of the Air Staff.

Air Vice-Marshal William Sholto Douglas, M.C., D.F.C., has been selected to be the first Assistant Chief of the Air Staff, and took up his appointment on February 17, being relieved in his previous appointment as Director of Staff Duties by Air Commodore Robert Peel Willock.

It has also been decided to create separate Deputy Directorates for Operations (Home), and for Operations (Overseas). Group Captain D. F. Stevenson, D.S.O., O.B.E., M.C., the present Deputy Director of Operations will become Deputy Director of Operations (Home), and Wing Commander W. A. Coryton, M.V.O., D.F.C., will be appointed Deputy Director of Operations (Overseas), with effect from March 7.

Air Vice-Marshal W. S. Douglas, born in 1893, was appointed 2nd Lieutenant on probation in the Royal Field Artillery (Special Reserve) in August, 1914, and was posted as an Observer Officer to No. 2 Squadron, Royal Flying Corps, in France, in January, 1915. He became a Flying Officer in July of that year. Later he commanded in France Nos. 43 and 84 Squadrons, and No. 22 Wing Headquarters, and attained the rank of Lieutenant-Colonel. For his services he received the M.C., D.F.C., French Croix de Guerre, and was mentioned in despatches on three occasions.

In March, 1920, he was granted a permanent commission in the Royal Air Force as a Squadron Leader. Since then he has filled appointments on Staff and Administrative duties at home and in the Sudan, and held the command of the Royal Air Force station at North Weald. He graduated at the Royal Air Force Staff College in 1922, and subsequently passed a course at the Imperial Defence College, where in 1932 he became an instructor. Since January, 1936, he has been Director of Staff Duties at the Air Ministry.

He was promoted to the rank of Wing Commander in 1925, to Group Captain in 1932, to Air Commodore in 1935, and to his present rank in January, 1938. He has been awarded the Gordon Shepherd Memorial Essay Prizes on several occasions.

Air Comdre. R. P. Willock, born in 1893, was commissioned in the Army as a temporary 2nd Lieutenant in 1914, and after joining the Royal Flying Corps two years later, was granted a permanent commission in the Royal Air Force in 1919, with the rank of Squadron Leader.

During the Great War he served both at home and overseas, being mentioned in despatches while in Egypt in 1918. He was posted to command No. 4 Armoured Car Company in Iraq in 1922, being mentioned in despatches in connection with the operations in Kurdistan in the following year. After his return to the United Kingdom in 1926 he attended the Senior Officers' School, and a year later was appointed to the Air Ministry for Air Staff Duties. In 1928 he was appointed to command the Royal Air Force Station, Kenley, and in 1930 passed a course at the Army Staff College, Camberley. He was posted to Headquarters, Fighting Area, for Air Staff Duties in 1931, and two years later, after a short period at the Air Ministry in the Department of the Chief of the Air Staff, became Air Attaché, Shanghai. During the past year he has attended a course at the Imperial Defence College.

He was promoted to the rank of Group Captain in 1934, and to his present rank in January, 1938.

Group Capt. D. F. Stevenson, born 1895, joined the R.F.C. as Flying Officer in 1916, being appointed Flight Commander the following year. In 1919 he was granted a permanent commission in the Royal Air Force, was promoted Squadron Leader in 1925, Wing Commander in 1933, and Group Captain this year. He was employed in Staff Duties at Headquarters Inland Area and Headquarters, Iraq, in 1924, and commanded No. 6 (A.C.) Squadron in 1925. In 1931 he was appointed to the command of No. 12 (B) Squadron, and in 1933 was on duty at Headquarters, Palestine and Transjordan. Since January of this year he has been deputy Director of Operations at the Air Ministry.

In 1917 he was awarded the Military Cross for conspicuous gallantry and a Bar to the Military Cross, the Distinguished Service Order in 1918, was mentioned in despatches in 1918 and 1919, and received the O.B.E. (Mil.) in 1937.

Wing Cdr. W. A. Coryton, born 1895, was appointed 2nd Lieutenant in the Rifle Brigade in September, 1914. In 1917 he was posted to the R.F.C., became a Flying Officer in 1919, Flight Lieutenant in 1921, and Squadron Leader in 1925.

He served as Instructor at Flying Wing at the R.A.F. College in 1920, and in the same year was posted to No. 31 Squadron in India. He was awarded the Distinguished Flying Cross in 1922 for gallant and distinguished service in Waziristan, and was promoted to the rank of Wing Commander in 1933. After serving at the Air Ministry in 1932, he was posted to Headquarters, Coastal Area, for staff duties and was attached to Headquarters, Iraq, in 1935 for special duty at Mosul.

Royal Air Force Volunteer Reserve

FLYING training is now being given at twenty aerodrome centres, and the number of centres is to be increased during the present year.

Central Flying School

THE undermentioned officer and airman pilots who attended the flying instructors' course at the Central Flying School from August 23, to November 6, 1937, have been categorised as follows:—

B.—Flt. Lt. C. M. H. Outram, Flt. Sergts. G. R. Aggett, W. T. Jeffrey, R. K. Webb, Sergt. H. E. Davies.

Flying Training Schools

THE following officers and airmen have been awarded special assessments at Flying Training Schools on completion of their courses of instruction:—

No. 2 F.T.S., BRIZE NORTON: *Distinguished Pass.*—A.P/O.s E. F. Nind and J. A. Slater, A./Sgt. T. E. Jones.

No. 6 F.T.S., NETHERAVON: *Distinguished Pass.*—A.P/O.s J. R. Appleton, D. F. Beardon, W. H. Coleman, R. M. J. Cowles, P. H. Woodruff, A./Sgt. J. Ashmore.

No. 11 F.T.S., WITTERING: *Distinguished Pass.*—A.P/O.s A. J. Handley, C. W. Poulter, P. R. M. Williams, A./Sgt. W. H. Heayns.

Progress of Expansion

WHEN the decision to expand the Air Force was announced in May, 1935, it was estimated that about fifty new stations would be needed. By the beginning of the present year twenty-six new stations and armament training camps had been opened, and twenty other sites had been selected.

Since April 1, 1935, about 4,100 pilots have been accepted, while the number of airmen who have entered amounts to about 28,300. Some 5,650 apprentices are being trained at Halton and Cranwell, and 1,130 boy entrants are also under training. The total strength of the Force is now about 65,000.

SERVICE AVIATION (CONTINUED)

IN SERVICE SOON : A new view of the Pegasus-engined Vickers Wellington I medium bomber, which will before long be standard equipment in the R.A.F. There is a Nash and Thompson multi-gun turret in the nose and stern, and a third gun position amidships.

Move of a Squadron

No. 53 (A.C.) Squadron will move from South Farnborough to Odiham on April 9.

Empire Air Day

Empire Air Day will be celebrated this year on Saturday, May 28. The majority of the stations in the home commands will be opened to the public under arrangements similar to those which have been made in past years. A list of the stations to be opened will be promulgated shortly in an Air Ministry Order.

A memorandum outlining the general administrative arrangements for Empire Air Day this year will be issued as early as possible direct to the officers commanding the stations concerned. This will incorporate a large number of the suggestions which were put forward by station commanders as the result of the experience gained during Empire Air Day last year. A meeting to co-ordinate flying co-operation between stations will be held at the Air Ministry in due course. No previous arrangements for this co-operation should therefore be made.

Reunion Dinners

A reunion dinner for officers who served at Singapore will be held at the Criterion Restaurant at 7.45 p.m. on March 4. Evening dress with decorations will be worn. Officers desirous of attending should communicate with Sqn. Ldr. G. A. R. Muschamp, Royal Air Force Station, Feltwell, Nr. Thetford, Norfolk.

It is proposed to hold a dinner in celebration of the Jubilee of No. 4 (A.C.) Squadron, which, owing to the force of circumstances, could not be held last year on the actual 25th anniversary of the formation of the Squadron. The hon. sec., F/O. A. R. W. Shipley, wants to get in touch with as many officers who were in the Squadron as possible, so as to get some idea of the probable attendance. It is proposed to hold the dinner some time in the late summer—the exact date cannot be arranged until the Squadron's commitments are more fully known

Record Intake of Pilots

Although the number of pilots required by the Royal Air Force during the present year, which ends on March 31, reached the record figure of 1,750, the whole of that number had been obtained by the end of January. Of the total, approximately 1,300 have been accepted from candidates from civil life and the balance, in accordance with normal policy, are selected volunteers from serving airmen in the Royal Air Force. The total number of pilots who have been entered since the expansion began in 1935 now exceeds 4,500.

The requirements of short-service officer pilots for the year ending in March, 1938, having thus been met two months before the close of the current year, applications are now being accepted from candidates in civil occupations to enter the Royal Air Force for training as pilots during the year beginning in April. The number of vacancies will be in excess of the 1,300 taken this year.

The applications should be addressed to the Secretary (Dept. S.7/Y) Air Ministry, Kingsway, London, W.C.2, from whom can be obtained full particulars of the conditions of service.

Appointments are for four years on the active list, followed by six years on the reserve. A gratuity of £300 is paid at the end of active list service. Pupil pilots receive, on entry, pay of 16s. 6d. a day and their remuneration is advanced to £333 per annum, plus allowances, on appointment as acting pilot officers. Private means are not therefore required.

Special arrangements have been made by the department to ensure that every facility is given by the R.A.F. education service to enable young officers to prepare for a civil career, and an officers' employment organisation was created some years ago to assist officers to find suitable posts on termination of their active service.

Transfer to Air Branch, R.N.

By agreement with the Lords Commissioners of the Admiralty, arrangements have been made for the selection of a limited number of officers who are serving or have served on short-service commissions (including those extended to medium service) in the general duties branch of the Royal Air Force for appointment to short-service commissions in the air branch of the Royal Navy.

Officers now in the Reserve must have completed four or more years on the active list of the Royal Air Force. Officers need not have had experience with the Fleet Air Arm during their R.A.F. service.

Officers transferred under this order will terminate finally their connection with the Royal Air Force.

The rank and seniority of officers still on the active list will be as follows:—

Rank in R.A.F.	*Rank and seniority in R.N.*
A.P/O.	Acting sub-lieutenant (A) with the same seniority.
P/O.	Sub-lieutenant (A) with the same seniority.
F/O.	Lieutenant (A) with the same seniority provided this does not exceed two years. Flying officers with more than two years seniority will be granted two years seniority only as lieutenant (A).
Flt. Lt.	Lieutenant (A) with two years' additional seniority.

Officers who have completed four years or more active service with the R.A.F. and have been transferred to the Reserve will be granted commissions as lieutenants (A) R.N., whether they held the rank of flight lieutenant or not. Officers who held the rank of flight lieutenant, R.A.F., on terminating their active service in the Royal Air Force will be granted the same seniority as lieutenant (A) R.N. as they then held in the rank of flight lieutenant R.A.F. The seniority of other officers will date from transfer.

Officers will become eligible for retired pay on reaching the age of 40 or completing 20 years' combined R.A.F. and R.N. service, whichever is later.

Flying Accidents

The Air Ministry regrets to announce the following accidents:—

P/O. Philip Ralph Austin-Sparks lost his life in a collision in the air which occurred near North Weald on February 11, between two aircraft of No. 65 (F.) Squadron, Hornchurch, Essex. P/O. Austin-Sparks was the pilot and sole occupant of one aircraft.

An accident occurred at Oulton, near Aylsham, Norfolk, on February 11, to an aircraft of No. 144 (B.) Squadron, Hemswell, Lincoln, in which P/O. Lawrence Clement Mitchell, Corpl. George Henderson, and A/C.1 Clifford Alfred Smith lost their lives.

P/O. Merton Vivian Baxter lost his life in an accident which occurred at Lewes on February 22 to an aircraft of No. 1 (Fighter) Squadron, Tangmere, Sussex. P/O. Baxter was the pilot and sole occupant of the aircraft.

P/O. John Robert Limmer Edminson is missing and believed drowned as the result of a collision in the air which occurred at sea off Spithead on February 24, between two aircraft of the R.A.F. Station, Gosport. P/O. Edminson was the pilot and sole occupant of one aircraft. The occupants of the second aircraft were uninjured.

L.A/C. George Griffiths lost his life and A.P/O. John Morton Littler was slightly injured as the result of a collision in the air which occurred near the Suez Canal on February 25, between two aircraft of No. 33 (Bomber) Squadron, Ismailia. L.A/C. Griffiths was a passenger of the aircraft of which the pilot, F/O. H. W. Bolingbroke, was not injured. A.P/O. Littler was the pilot and sole occupant of the second aircraft.

SERVICE AVIATION (CONTINUED)

The Blenheim Gets Going

PARTICULARLY convincing because it was made in conditions which appear to rule out wind as a contributory factor, was a recent Service flight by a Blenheim medium bomber from Abbotsinch, near Glasgow, to Upavon, Wiltshire, a distance of 335 miles. The Blenheim accomplished the journey in 70 minutes from take-off to touch-down, including the initial climb to about 15,000ft. This works out at an average of 288 m.p.h.

At approximately the same time an Avro Anson general reconnaissance machine, cruising at 150 m.p.h. air speed at 7,000ft., was travelling in the opposite direction and completed the trip in 2 hr. 5 min., giving an average ground speed of 160.8 m.p.h., which means that there was a helping wind of about 11 m.p.h. The likelihood is, then, that the wind was against, rather than with, the Blenheim. Ground mist limited visibility to about 1,000yd. and the pilot flew most of the way on his instruments.

Flights by Blenheims in the Middle East, between Dhibban and Aboukir (811 miles) are usually completed in three-and-a-quarter hours at an average of 250 m.p.h.

Many R.A.F. squadrons have been armed with the Blenheim since the last R.A.F. display in which one Blenheim-equipped unit was represented, and the machine has been released for sale to certain foreign countries, including Finland, Yugoslavia and Turkey. It is reported from Belgrade that two Blenheims achieved 294 m.p.h. in official tests, which is about 10 m.p.h. more than the speed set out in the contract. It is common knowledge that the 280 m.p.h. given in this country as the official maximum speed is conservative. The general belief is that the speed is nearer 300 m.p.h.; certainly this figure is rapidly attained if the nose is eased down very slightly.

These performances are particularly gratifying in view of the fact that the French Potez 631 fighter-light bomber on order for, but not yet supplied to, the French Armée de l'Air is credited with a top speed of only 285 m.p.h.

Royal Air Force Gazette

General Duties Branch

Air Comdre. R. P. Willock is appointed Director of Staff Duties, Air Ministry, vice Air Vice-Marshal W. S. Douglas, M.C., D.F.C. (February 17).

Flt. Lt. H. G. Lee is granted a permanent commission in that rank (February 21).

Flt. Lt. P. B. Coote is seconded for duty with the British Military Mission, Egypt (February 10); Cdr. M. Cursham, R.N., Sqn. Ldr. R.A.F., ceases to be attached to the R.A.F. on return to Naval duty (December 31, 1937); Wing Cdr. J. A. G. de Courcy, M.C., is placed on the retired list at his own request (February 20); Wing Cdr. J. C. M. Lowe is placed on the retired list (February 21); Flt. Lt. W. W. E. Oliver relinquishes his short-service commission on transfer to the Royal Australian Air Force Reserve (February 21).

Medical Branch

Flt. Lt. G. H. Stuart, M.B., B.S., M.R.C.S., L.R.C.P., is granted a permanent commission in that rank (January 7).

Royal Air Force Reserve

General Duties Branch

The following are granted commissions as Flight Lieutenants in Class C with effect from the dates stated:—F/O. H. A. C. Atkinson (January 1); Maj. W. B. D. Booker (R.A.R.O.); Lt.-at-Arms A. R. Hughes, M.B.E. (R.N., Ret.) (January 6).

F/O. W. Dougall is promoted to the rank of Flight Lieutenant (February 8); Flt. Lt. F. Gower-Jones is transferred to Class A.

Royal Air Force Appointments

General Duties Branch

Air Vice-Marshal.—P. H. L. Playfair, C.B., C.V.O., M.C., to H.Q., No. 1 (Bomber) Group, Abingdon; on appointment as Air Officer commanding, 24.2.38.

Group Captain.—A. Lees, D.S.O., A.F.C., to R.A.F. Station, Driffield; to command, 7.2.38.

Squadron Leaders.—G. R. Beamish, to Directorate of Operations and Intelligence, Air Ministry, vice Sqn. Ldr. W. G. Cheshire, 24.1.38. I. A. Bertram, to No. 1 (F.) Squadron, Tangmere; to command, 24.1.38. W. A. Opie, to No. 2 (A.C.) Squadron, Hawkinge; to command, 21.1.38. R. Pyne, D.F.C., to No. 32 (F.) Squadron, Biggin Hill; to command, 24.1.38. J. B. H. Rogers, to No. 72 (F.) Squadron, Church Fenton; to command, 11.1.38. T. G. Pike, to No. 10 F.T.S., Tern Hill; for flying duties in Advanced Training Squadron, 24.1.38.

The undermentioned are posted to the R.A.F. Staff College, Andover, with effect from 24.1.38:—J. E. M. Bainbridge, The Earl of Bandon, G. Bartholomew, H. Broadhurst, A.F.C., G. M. Buxton, C. S. Cadell, W. G. Cheshire, J. M. Cohu, A. R. Combe, R. Costa, J. C. Cunningham, T. C. Dickens, H. P. Fraser, A.F.C., C. F. H. Grace, E. C. Hudleston, A. W. B. McDonald, A.F.C., J. R. Mutch, L. T. Pankhurst, M. G. Philpott, J. N. T. Stephenson, F. R. D. Swain, A.F.C., J. B. M. Wallis, A. H. Wheeler, F. R. Worthington, B. C. Yarde. D. Macfadyen, to Directorate of Organisation, Air Ministry, 1.2.38. B. D. Nicholas, to Electrical and Wireless School, Cranwell, 10.2.38.

Flight Lieutenants.—P. B. Coote, to Special Duty List; seconded for duty with British Military Mission, Egypt, 10.2.38. L. A. Cubitt, to No. 4 F.T.S., Abu Sueir, 7.2.38. R. T. Cazalet, to Experimental Establishment, Royal Aircraft Establishment, South Farnborough, 8.2.38. A. D. Isemonger to No. 76 (B.) Squadron, Finningley, 22.1.38. A. Earle, to H.Q., R.A.F., Far East, Singapore, 12.2.38. E. H. Bellairs, F. J. St. G. Braithwaite, B. A. Casey, A. E. Dark, D. W. Lane, H. V. Satterly, to the R.A.F. Staff College, Andover, with effect from 24.1.38. W. L. Houlbrook and N. C. S. Rutter, to Home Aircraft Depot, Henlow, 31.1.38.

Equipment Branch

Squadron Leaders.—E. A. Slater, to H.Q., R.A.F. Iraq, Dhibban; for Equipment Staff duties, 19.1.38. G. G. C. Pigott, to R.A.F. Station, Cardington; for Equipment duties, 3.2.38.

Flight Lieutenants.—W. T. Lewis, to R.A.F. Station, Ismailia, Egypt, 23.1.38. E. H. Walker, to H.Q., R.A.F., Far East, Singapore, 12.2.38. H. J. Butler, R. C. Storrar, H. A. Sudbury, J. E. V. Tyzack; to the R.A.F. Staff College, with effect from 24.1.38.

Medical Branch

Flight Lieutenants.—H. C. de B. Milne, to R.A.F. Station, Waddington, 11.2.38. J. H. Neal, to R.A.F. Station, Dhibban, 22.1.38.

Owing to the greatly increased length of these lists as a result of R.A.F. expansion, ranks are confined to those of Flight Lieutenant and above.

FOREIGN SERVICE NEWS

U.S. Aircraft for France?

IT is believed in well-informed quarters that the French Air Ministry is in negotiation with American firms for the purchase of 300 military aircraft to make up for the lag in French production.

TURRETED: The nose of the Douglas B-18 bomber used by the U.S. Army Air Corps.

Corsairs for Mexico

TEN improved Vought Corsairs were lately delivered to the Mexican Army Air Corps. These American observation biplanes are powered with supercharged Pratt and Whitney Wasps, permitting operation from high-altitude aerodromes, and are fitted with cockpit enclosures.

Magisters in Egypt

FIVE Miles Magister trainers (D.H. Gipsy Major) took part in a display in connection with King Farouk's wedding celebrations. Altogether there were twenty-eight machines in the air, and the Magisters had no difficulty in flying for the full hour of the show at an average speed of 120 m.p.h. Finally all the machines dived in salute over the Royal Palace, coming down from 2,000ft. to 500ft. at full power.

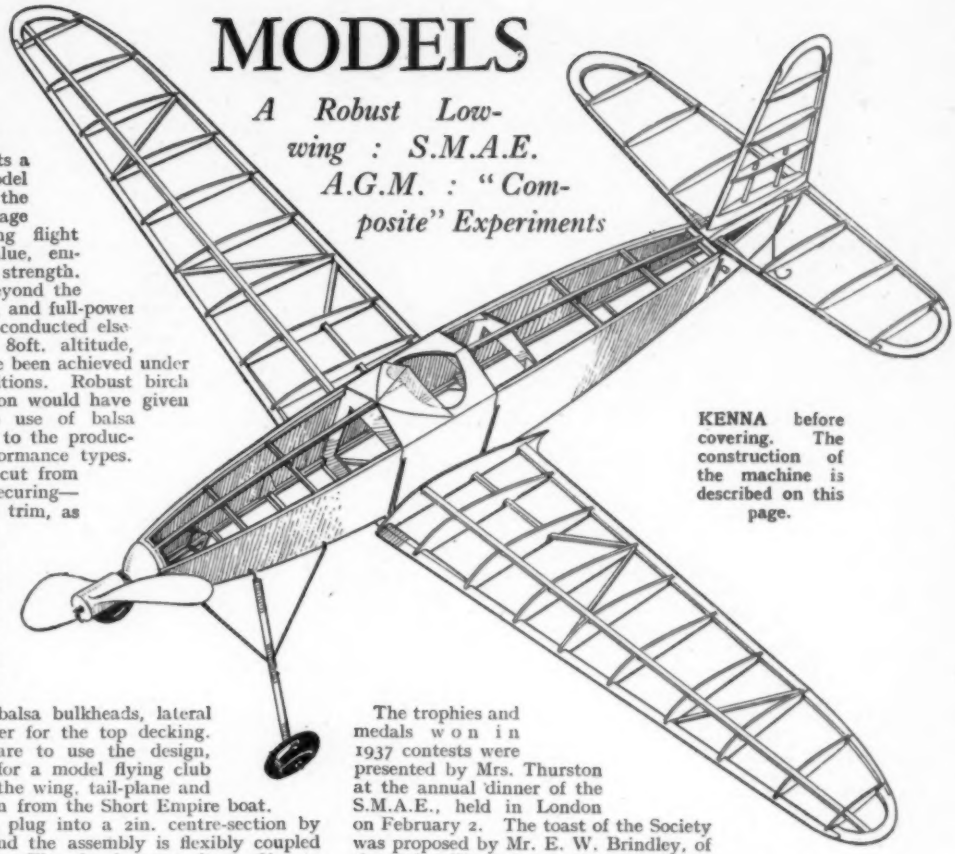
The T.5 Tested and Camouflaged

TESTS have lately been concluded by the Dutch National Aeronautical Laboratory on the Fokker T.5 heavy bomber as ordered in quantity by the Royal Dutch Air Force. With two 850-h.p. Bristol Pegasus XXI radials and D.H. v.p. airscrews, the T.5 reached 259 m.p.h. at 13,120ft. The prototype is the first Dutch military machine to be treated with a new system of camouflage with which the authorities are now experimenting.

MODELS

A Robust Low-wing : S.M.A.E. A.G.M. : "Composite" Experiments

By M. R. KNIGHT



KENNA before covering. The construction of the machine is described on this page.

Built for Strength

THE illustration depicts a balsa practice model built by the writer. As the small size of the average flying-ground makes long flight duration of dubious value, emphasis has been placed on strength. Even so, *Kenna* sped beyond the confines of Primrose Hill, and full-power tests had perforce to be conducted elsewhere. A 4ft. take-off, 80ft. altitude, and 57 sec. duration have been achieved under indifferent weather conditions. Robust birch and steel wire construction would have given similar results, but the use of balsa forms a convenient step to the production of modern high-performance types.

The fuselage sides are cut from ⅛in. balsa sheet, thus securing—and retaining— accurate trim, as wing, tail and thrust settings are built in. The sides cannot be split from end to end by a burst motor, as the grain runs vertically, an idea for which I am indebted to Mr. C. A. Rippon. Light longerons are cemented to the sides, and assembly is completed with three balsa bulkheads, lateral cross-pieces, and a stringer for the top decking.

As Imperial Airways are to use the design, should plans materialise for a model flying club amongst their personnel, the wing, tail-plane and fin shapes have been taken from the Short Empire boat.

Two 12in. wing panels plug into a 2in. centre-section by means of birch dowels, and the assembly is flexibly coupled to hooks on the fuselage. The chord tapers from 4⅜in. to 1¾in., the sweep-back of the leading edge being twice the forward sweep of the trailing edge. There are 9 degrees of dihedral. The perfectly flat lower surface facilitates the avoidance of warps during construction, and the detection of any that subsequently develop.

Bamboo pegs in the fin base plug into celluloid tubes in the non-lifting tail-plane, which is flexibly coupled to the fuselage. The tailplane is 11in. in span, and tapers in chord from 3¼in. to 2¼in. The fin is 4in. high, and 2¼in. to 3¼in. in width. Bamboo struts, sprung with short curved pieces of 20-gauge wire, form the detachable undercarriage. A free-wheeling airscrew, 10in. in diameter and 14in. in pitch, is turned by a 24in. four- or six-strand skein of ¼in. rubber, plaited in tension.

Wing, tail unit, and the top and bottom of the fuselage are covered with Jap tissue, and these components, together with the fuselage sides and airscrew, are proofed with banana oil.

Two S.M.A.E. High-spots

SUBSTANTIAL progress and expansion were the keynotes of reports given at the well-attended annual general meeting of the Society of Model Aeronautical Engineers, which marked the conclusion of the second year under the reformed constitution. At the time of re-organisation there were 14 affiliated clubs, now there were 53, and numerous applications were pending. In two years a large financial deficit had been transformed into a substantial balance. Some idea of the magnitude of the Society's activities may be gathered from the fact that during 1937 the hon. secretary had written approximately 800 letters, just double the number writen in 1936.

Among points in the secretary's report was the fact that handsome trophies had been donated by Mrs. A. P. Thurston, Capt. L. F. Plugge, M.P., Capt. C. E. Bowden, the Air League, and International Model Aircraft, Ltd.

The following officers were unanimously re-elected: President, Dr. A. P. Thurston; vice-presidents, the Duke of Richmond and Gordon, Messrs. G. Geoffrey Smith, M.B.E., A. F. Houlberg, W. E. Evans, B. K. Johnson, and Capt. C. E. Bowden; chairman, Mr. A. F. Houlberg; vice-chairman, Mr. L. J. Hawkins; hon. secretary, Mr. E. F. H. Cosh; hon. treasurer, Mr. L. J. Hawkins; competition secretary, Mr. J. C. Smith; Press secretary, Mr. H. York; technical secretary, Mr. R. N. Bullock. Capt. L. F. Plugge, M.P., was elected a vice-president.

The trophies and medals won in 1937 contests were presented by Mrs. Thurston at the annual dinner of the S.M.A.E., held in London on February 2. The toast of the Society was proposed by Mr. E. W. Brindley, of the Balsa Wood Co., and responded to by the president, Dr. Thurston, who announced that the Aero Club de France was identifying itself with the Wakefield contest, to be held at the Caudron aerodrome, Guyancourt, on July 31 next.

Composite Models

THE recent separation flights of the Short-Mayo composite aircraft lend interest to the experiments made at Danson Park last summer by Mr. H. A. Jones, Senr., of the North Kent Model Aircraft Society. A half-ounce parasol monoplane was anchored to a heavyweight high-wing model by means of a rubber band passing over the centre section and airscrew, and held between the nose-piece and fuselage of the "porter" model by the tension of the elastic motor. The unwinding of the motor eventually allowed the band to fall away, whereupon the parasol went up like a lift and flew for 80 seconds.

One also recalls that some years ago at Wimbledon, Mr. A. M. Willis, of The Model Aircraft Club, used a rather similar method for launching a glider.

* * *

Amongst S.M.A.E. Rules is one requiring every petrol model owner to be insured against third-party claims. Thanks to the initiative of Mr. A. E. Brooks, designer of the Comet and Spitfire two-strokes, the Model Aircraft Stores, of 127b, Hankinson Road, Bournemouth, is sponsoring an excellent scheme by Mr. Dudley Ship, a Bournemouth insurance broker. Cover up to £2,500 is provided in respect of one engine, which may be installed in any number of fuselages, provided these are registered, for a modest outlay of 7s. 6d. per annum, plus an initial charge of 1s. for the policy.

* * *

Just two of several delightful passages from a model aircraft constructional drawing emanating from Japan deserving quotation:—

"Test: Please look into wing backwing and stand wing, etc., and tur turn of propeller. And drop in oil at coshon ball of propeller.

"Flying: At first see throgh from forward and get it mended all out of order. Next time opposite direction for wind blow at open ground, 40-60 M long line. And ATTENTION. Then start itself from the ground. Please point at combine point without fail, because of motionless combine point. Please according to elucidation method of bend the turning of every bamboo."

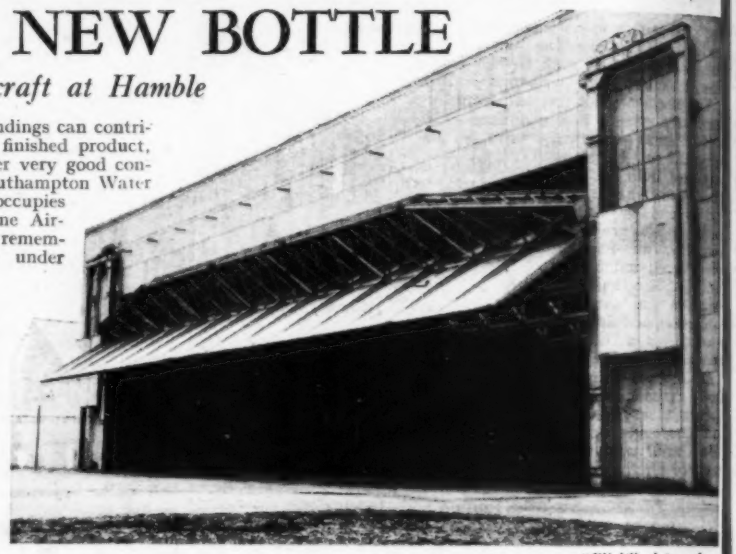
OLD WINE, NEW BOTTLE

A Visit to Folland Aircraft at Hamble

IF working and living in pleasant surroundings can contribute something to the quality of the finished product, Folland Aircraft, Ltd., starts life under very good conditions. Situated on the banks of Southampton Water—at Hamble, to be exact—the firm now occupies the premises established by British Marine Aircraft, Ltd., which was founded, it may be remembered, to build Sikorsky flying boats under licence. The works were well planned and equipped with up-to-date machinery, and there are few jobs in the construction of modern metal aircraft which cannot be tackled. The factory is entirely self-contained, with sections for drawing, rolling, pressing, drop-stamping, heat and anodic treatments, sheet-metal work and the hundred-and-one necessities of a modern aircraft factory.

A housing estate adjoins the works. Not only is workers' travelling time saved in this way, but the men live within a stone's throw of Southampton Water, with its never-ending spectacle of shipping. In the circumstances it is small wonder that many of the houses on the estate are let to workers who are not, one fears, employed by the company. Some work at other aircraft factories in the vicinity!

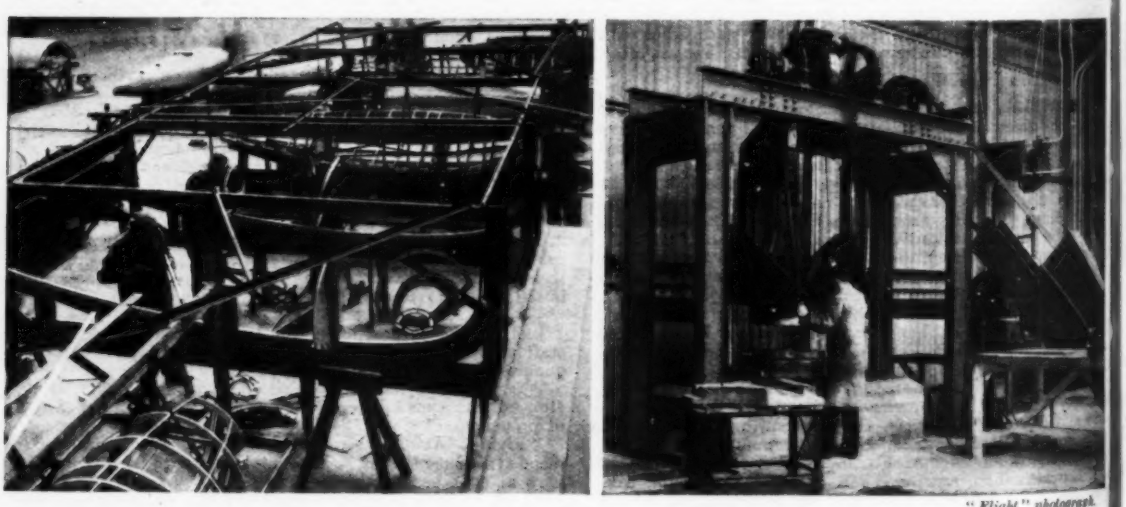
The offices of Folland Aircraft are housed in a very fine old mansion, which has been converted where necessary, but large portions have been left in their original state. The result is a charming blending of old-world peace and comfort with ultra-modern industry.



"Flight" photograph.

Some idea of the size of the erecting shed of Folland Aircraft, Ltd., may be formed from the fact that it will accommodate five flying boats of the Empire class and allow room to work on them. Above is the old mansion—the offices.

For the present, most of the work being done in the Folland factory is in the nature of sub-contracts for various aircraft firms. Outboard floats for flying boats, engine nacelles for large four-engined landplanes, tail units for one of the latest types of single-seater fighter; these form the bulk of the work. But in addition the firm has undertaken repairs and modifica-



"Flight" photograph.

Quite a number of outboard floats for flying boats are being built in the works section shown on the left. Light alloy panels are manufactured in considerable numbers by the drop hammer shown on the right.

"Flight" photographs.

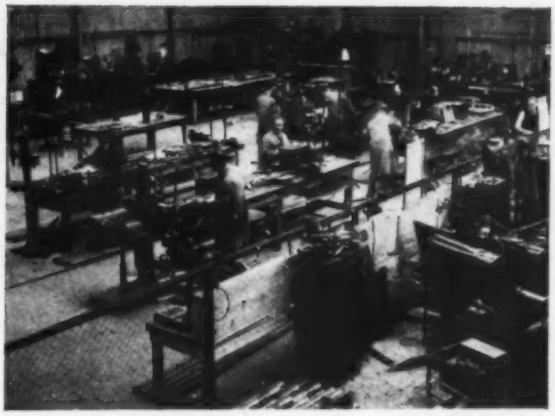
A considerable proportion of the work at present being carried out is the manufacture of engine nacelles.

tions to Short Empire flying boats for Imperial Airways, Ltd.

On entering the erecting shed one is amazed to find that this building accommodates no fewer than five of the Empire boats. Not only so, but work is going on on all of them, leaving sufficient room for the men to move about without getting in one another's way. The works are particularly well situated for dealing with jobs of this kind, as they have their own slipway from which the Empire boats, with their 114ft. span, can be transported from the beach to the shed. Recently one boat was returned for extensive repairs to planing bottom and bows, and it was in commission again in about a fortnight.

The technical staff of Folland Aircraft, Ltd., includes several men whose names have been familiar in British aviation for very many years. Mr. H. P. Folland, managing director, joined the Royal Aircraft Factory (as it then was) at Farnborough in 1912. As assistant chief designer under Major F. M. Green he was closely associated with such machines as the S.E.5 and, before that, the S.E.4, which latter was well ahead of its time and incorporated many ideas now regarded as modern, such as careful streamlining and trailing-edge flaps.

As chief designer first to the British Nieuport Company and afterwards to the Gloster Aircraft Co., Mr. Folland was responsible for many famous types, notably in the single-seater fighter class, and probably had more machines in service in the R.A.F. than any contemporary designer. In addition to these, he designed some famous racers, beginning with the Bamel and culminating in the Gloster Schneider Trophy machines.



The tool room is well-equipped and staffed by skilled workers who produce special tools for the manufacture of intricate aircraft parts.

Mr. H. E. Preston, who has been Mr. Folland's second-in-command since the Farnborough days, is now chief designer, and is assisted by Mr. Frank Radcliffe, who was on the Gloster technical staff for a great many years and who afterwards joined Airspeed, Ltd., for a time.

Mr. G. H. Handasyde, one of Great Britain's pioneer aircraft designers, is the firm's chief engineer, and the works are in charge of Mr. W. H. Mace, who was works manager to Hawker Aircraft, Ltd., from 1923 to 1936.

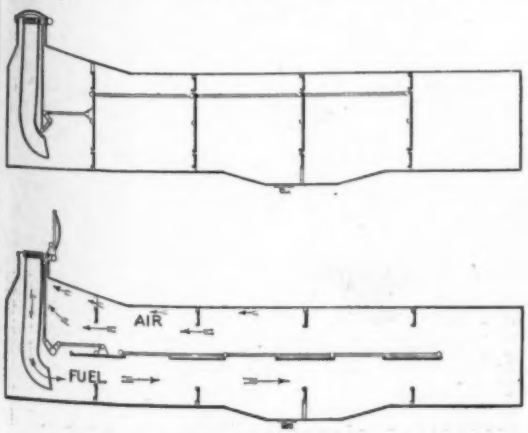
All of which facts make it clear that Folland Aircraft, Ltd., very definitely have the technical qualifications for contributing their share to the future of British aviation.

COOLERS and HEATERS

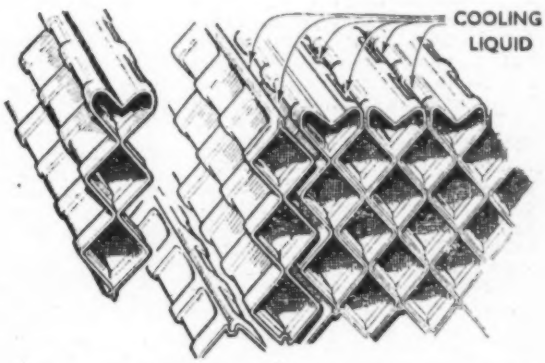
—and Something New in Tanks

IT would be interesting to be able to describe certain of the aircraft products of Gallay, Ltd., which are for machines which may not be described in detail. However, among their specialities which may be mentioned are the combined oil and coolant radiator for a well-known medium bomber, fuel tanks for a two-engined training type, and cabin heaters with air conditioning for several heavy bombers and large commercial machines.

Another product, a new design of anti-surge quick-filling fuel tank is being tested, and very favourable reports have been received from Capt. George Eyston, who had examples fitted to his twelve-hour-record-holding car, *Speed of the Wind*.



How the baffles in the Gallay quick-fill tank are moved clear when the cap is opened.



A section of Gallay low-drag cooling radiator as used on a well-known medium bomber. It is made up from cupro-nickel strip in triple-tube formation.

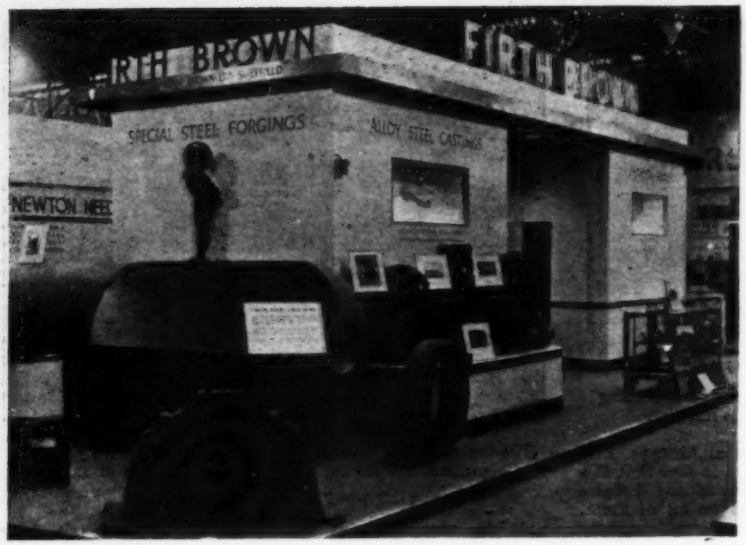
During the war, radiators to cool the 200 h.p. Hispano-Suiza engines on the Sopwith Dolphin weighed at least 50 lb. until Gallay introduced their improved version weighing only 22 lb.

Several special features are embodied in the combined radiators mentioned above. The cupro-nickel tubes are made from strip in lengths up to two feet and have shoulders on them to permit interflow of cooling liquid.

Cupro-nickel, it is stated, is suitable for ethylene-glycol or other chemical coolants, and is light, long lasting, conducts heat well, and is easy to solder. An improved honeycomb design is favoured, with long tubes and a small frontal area. The content of cooling liquid is small, and the radiator is designed for quick flow.

Coupled with this larger radiator is a Gallay dual-stage oil cooler, suitably designed to prevent overcooling and congealing of the oil in long glides. When maximum cooling is required the oil flows through both large- and small-bore tubes, but when only the first stage is wanted the flow is through the

(*Concluded on p. 218.*)



"Flight" photograph

Some "heavy metal" on the Birmingham stand of Firth-Brown, equally famed for light alloy steel castings and forgings for aircraft work.

representative display of this firm's welding equipment, though one or two interesting items are on view.

The plant produced includes combination forming and seam-welding machines, hand-operated flash-welding equipment with pneumatically operated gripping dies, motor-driven spot welders, notable for their rapidity, seam welders for circumferential seam welding and some interesting portable spot-welding equipment, specially designed for panel assembly work

Ebonestos Industries, Ltd., Excelsior Works, Rollins Street, London, S.E.15 (Olympia, A.697).—Here may be seen some typical examples of the mouldings of all types which Ebonestos Industries are doing for the aircraft trade under Air Ministry contracts, including such parts as instrument cases, dashboard fittings, control pulleys, cabin fittings, and so forth.

MORE about the B.I.F.

Some Further Points of Aeronautical Interest Noted During Tours of the Birmingham and London Sections of the Fair

LAST week *Flight* mentioned the exhibits of some fifty firms among those composing the twelve-mile "shop-front" of the Castle Bromwich (Birmingham) section of the British Industries Fair—a really notable show, breaking all previous records for size and of the greatest value and interest to overseas visitors. All these fifty firms had exhibits of particular interest to the aeronautical industry, though it is indeed hard to define, especially in the case of makers of works equipment, where any given product ceases to be of special interest to our own industry and begins to be of universal application in engineering.

The two pages here are mainly confined to the exhibits—plastics, and so forth—at the London section of the Fair, though some additional notes on the Birmingham division are also included. The location of the stand—London or Birmingham—is indicated in each case.

Bakelite, Ltd., 68, Victoria Street, London, S.W.1 (Olympia, A.684; Earls Court, 560; Birmingham, Cb.408).—At both the London and the Birmingham sections the visitor can learn what this firm, among the pioneers in plastics, can do for the aircraft constructor.

Instrument panels, control cable pulleys and radio insulators are among the typical components shown, and at Olympia there is a surprise for he who thinks that those nicely streamlined little radio masts which adorn military aircraft are invariably made of "tin"; here he will find one of Bakelite, little if at all heavier than the metal variety, and, of course, ready and willing to act as its own insulator.

British Celanese, Ltd., 22, Hanover Square, London, W.1 (Olympia, F.1420).—To the incautious B.I.F. visitor who mixes his Olympia with his Earls Court the British Celanese exhibit may be a little confusing, for the guileless seeker after aircraft materials may find himself investigating the merits of components known as "Wundies."

F.1420, Olympia, is the right destination, and here he can learn all about "Celastoid Novellon" clear sheeting, as used on the Short-Mayo composite.

"It is clear it is tough" is the happily descriptive slogan used of this material.

British Federal Welder and Machine Co., Ltd., Castle Mill Works, Dudley, Worcester (Birmingham, D.615 and 514).—Space on the stand does not permit a

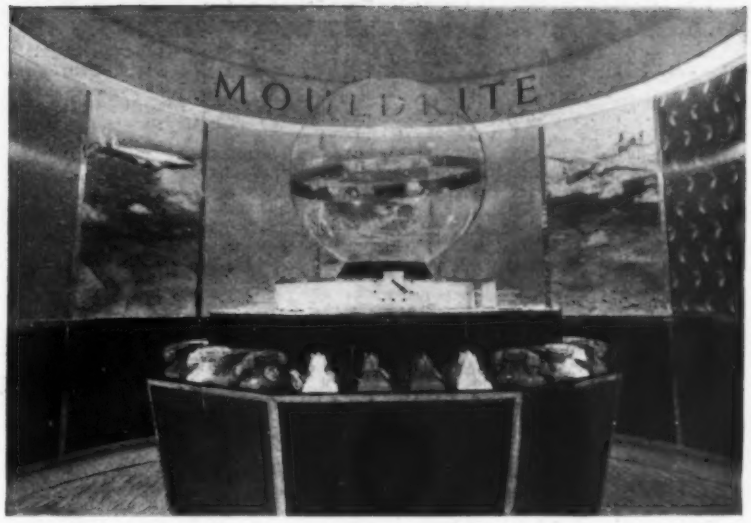
F. A. Hughes and Co., Ltd., Abbey House, Baker Street, London, N.W.1 (Olympia, 703).—Everyone in the aeronautical industry associates the name of F. A. Hughes with Elektron alloy, and thus it is a little startling to find, at Olympia, a fine exhibit devoted entirely to plastics—which, for certain aspects of construction, almost threaten to trespass on the grounds of alloys!

Here is demonstrated the use of "Rockite" synthetic resin in the "Jicwood" wood-impregnation process now being used for airscrews and other parts. Airscrew blades are shown, there is an 8in. box spar in "Jicwood," and there are also various types of leading edges; one is a two-ply bend in "Rockite" bonded to expanded rubber by the "Onizite" process.

Quite one of the most attractive aspects of the stand is a whole flock of miniature scale model aircraft, injection-moulded. Although each model is only three inches long, windscreens and windows are transparent.

Workshop lubricating and oil handling equipment—the Tecalemit exhibit at Birmingham.

"Flight" photograph



A big globe of crystal-clear "Perspex" on the Mouldrite stand at Olympia; behind can be seen enlarged *Flight* photographs.

Insulators, Ltd., Leopold Road, London, N.18 (Olympia, A.698).—Some idea of how specialised a business is the moulding of plastics can be gained on the stand of this firm, who are on the Air Ministry list for instrument cases, electrical switch-boxes, and so forth.

It might be thought that the moulding of an instrument case—e.g., for an air-speed indicator, with a couple of holes in the back and an odd knob here or there—would be a fairly simple matter. But here can be seen a die specially made for just such a job—two vast lumps of steel, with the moulding surfaces finished to the finest limits and then polished until they shine like chromium.

International Model Aircraft, Ltd., Triang Works, Morden Road, London, S.W.19 (Olympia, K. 1864).—Here may be found some superb miniature scale model aircraft, as well as the famous "Frog" flying scale models in enough national colours to allow the enthusiastic young collector to organise his own world war. Likewise there is the fine Goodsir pterodactyl model, which, described recently in *Flight*, has aroused so much interest that it is being marketed by International Aircraft as a constructional kit.

Harley landing lamp, as exhibited at Birmingham by Rotax, Ltd., in the extended position.

James A. Jobling and Co., Ltd., Sunderland, Co. Durham (Olympia, A.770 and A.783).—Air-racing enthusiasts will remember how Mr. E. J. Jobling-Purser, doing nicely in the eliminating contest of the last King's Cup Race, was compelled to put his Miles Whitney Straight down on the Town Moor, Newcastle, through shortage of fuel.

Here, at Olympia, you may learn just what Mr. Jobling-Purser's company—makers of "Pyrex," for those who like a homely flavour in such matters—can do in the way of special glassware, among which are included aerodrome boundary lights of the approved amber tint, "Dioptric" floodlight lenses, and glass insulators—which last items, one learned, have been found particularly suitable for use in the slightly damp conditions enjoyed by the wireless aerials of submarines.

Mavitta Drafting Machines, Ltd., Anchor Works, Park Road, Aston, Birmingham, 6 (Birmingham, D.704).—Refusing to be drawn into any arguments as to why drafting machines should be used by draughtsmen and not draftsmen, we can only advise those interested in modern drawing-office equipment to go along and see the specialised apparatus on stand D.704, where even the left-handed design artist is catered for.

Says the Mavitta catalogue: "Machines for double elephant or antiquarian boards." Which, reading "from" instead of "for," may or may not explain a whole lot about one or two recent aeroplanes.

Mouldrite, Ltd., Nobel House, Buckingham Gate, London, S.W.1 (Olympia, A.676 and A.685).—Here is enlightenment for anyone who, even knowing the clarity of "Perspex" for aircraft windscreens and windows, has never seen it in bulk, so to speak.

At the Olympia stand are thick blocks of "Perspex," which have the liquid clarity of the finest optical glass (and which, we believe, is even claimed to surpass it in this respect); they will show you a visiting card, unobscured, through three feet of solid "Perspex" rod.

A perfect four-foot globe, formed in two halves, proves the adaptability of the material to working, and big *Flight* photographs of famous aircraft show some of its ultimate destinations.

For the technically minded, it may be added that Mouldrite, Ltd.—an associate of Imperial Chemical Industries—are "manufacturers of phenolic- and urea-type thermosetting powders, resins and syrups, thermoplastics, 'Diakon' (moulding powder) and 'Perspex' (cast sheets, rods, etc.)."

Turner Brothers (Birmingham), Ltd., Cliveland Street, Birmingham (Birmingham, D.223) show examples of the work produced by their press tools. It is their claim that no tool is too large for them, and they make a speciality of quick delivery. Items produced on Genevoise jig borers and other machines reveal a high degree of accuracy and workmanship. Their service, besides the production of planned tools, includes the designing of special tools for any purpose.

Wellworthy Piston Rings, Ltd., 143, Suffolk Street, Birmingham (Birmingham, D. 229).—The terms "Welflex," "Superslot" and "Simplex" all denote a high degree of excellence in the various products to which they refer—compression, scraper and oil-control rings, all familiar and dependable Wellworthy products.

"Surelock" relates to valve-seat inserts, and although no ingenious name characterises the Wellworthy pistons and liners, they maintain the same high standard of quality.

Forthcoming Events

March 3. R.Ae.S. Lecture*: "Riveting Methods in Germany," by Dr.-Ing. W. Pleines.

March 4. Cambridge University Air Squadron: Annual Dinner, University Arms Hotel, Cambridge.

March 10. R.Ae.S. Portsmouth Branch Lecture: "Air Raid Precautions," by Sgt. Barnes.

March 11. Cinque Ports Flying Club: Annual Dinner and Dance, Grand Hotel, Folkestone.

March 23. R.Ae.C.: Annual General Meeting, 6.30 p.m., 119, Piccadilly, London, W.1.

March 24. R.Ae.S. Portsmouth Branch Lecture: "Refuelling in the Air," by Sir Alan Cobham.

March 25. Portsmouth Aero Club: Annual Ball, Pavilion Ballroom, Southsea.

April 1. Bristol and Wessex Aeroplane Club, Ltd.—Annual Dance, Victoria Rooms, Clifton.

April 7. R.Ae.S. Lecture*: "The Manipulation of the Boundary Layer," by Mr. E. G. Richardson.

April 21. R.Ae.S. Lecture*: "High-altitude Flying," by Prof. J. E. Younger.

April 28. R.Ae.S. Lecture*: "Factors Controlling the Development of Electrical Ignition on Aero Engines," by Dr. G. E. Bairsto.

May 14-22. Finnish Aero Show, Helsinki.

May 17. Air League of the British Empire: Annual Dinner, Grosvenor House, London.

May 28. Air League of the British Empire: Empire Air Day.

* All these lectures take place at the Institution of Mechanical Engineers, Storey's Gate, St. James's Park, London, S.W.1., beginning at 6.30 p.m.

THE INDUSTRY

A New Trainer

DETAILS of a factory to be established in the near future at Leicester airport, by Reid and Sigrist, for the manufacture of a "new type of training machine," have, it appears, been announced by Sqn. Ldr. G. H. Reid.

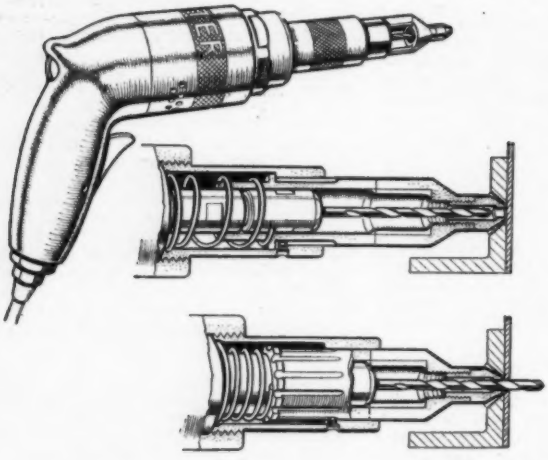
So far it has been a secret that a twin-engined three-tandem-seat training machine has been developed and built at New Malden, Surrey, where the firm have their instrument works. Reid and Sigrist have taken over two hangars at Braunstone which Leicester Corporation built for Crilly Airways and which were never used by that concern. The building of the trainers is to start in these hangars while the factory is being erected.

High-speed Holes

IT is now possible to describe and illustrate the latest addition to that never-ending flow of ingenious electric and pneumatic portable tools from the works of Desoutter Bros., Ltd., at The Hyde, Hendon, London, N.W.9. It is a tool which has been causing quite a lot of interest at the Birmingham B.I.F.

Known as a jig drill, it does away with the necessity for bushed drilling jigs, a very important consideration in modern, high-speed production of metal aircraft.

A study of the accompanying drawing almost tells the story at a glance. The jig, a simple, easily made template with the necessary number and arrangement of holes (not bushed, but merely tapered) is clamped up to the job. The tapered pig bush or nose of the Desoutter tool, with the actual drill hidden within it, is pushed into the tapered hole. Further pressure then causes the drill to emerge from its telescopic casing (though, more accurately the casing recedes to expose the drill). The drill does its duty, then a penetration stop limits the movement as soon as it breaks through, thus saving the operator fatigue.



This part-sectional view shows the *modus operandi* of the Desoutter jig drill.

Among advantages claimed are: Accuracy of positioning; telescopic guide, steadying drill, allows motor speeds up to 14,000 r.p.m.; drill does not have to blunt itself on corners of hard jig bushes; and drill is protected from breakage.

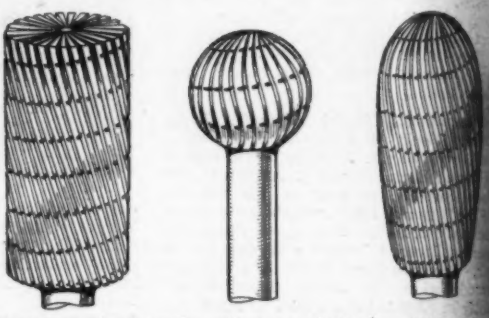
Jig maintenance is obviously reduced, and it is stated that for non-precision jobs plywood jigs are quite satisfactory. Another practical feature is that a wide sector of the telescopic nose is cut away to allow work right up in the angle of corners.

It is stated that 100 holes a minute have been drilled with the new tool, which is at present pneumatic only; an electric one is on the way.

Flexible Fettling

TIME was when much of the excess metal on a casting had to be laboriously chipped and scraped off by hand. More recently certain firms in Germany have been producing a range of rotary milling tools, resembling scaled-up dentist's drills, which have been used extensively in conjuction with suitable flexible drives.

Mr. Hands, of F. Gilman (B.S.T.), Ltd., tells us that hitherto this has been the only source of such tools. With the increased demand for these rotary milling shapes in all our aero-engine factories, the need for their home production became urgent. Co-operating with the Air Ministry, the firm of F. Gilman, Ltd., of Regent Street, Smethwick, Staffs, are now beginning to produce several shapes, and soon a large range will be available. Examples with 6 mm. shanks for recommended speeds of 1,500 to 3,000 r.p.m. may be seen at the B.I.F. Birmingham Section (Stand Cb.516).



Three examples from the wide range of Gilman milling tools.

Napier Results

AS foreshadowed by the chairman a year ago, the accounts of D. Napier and Sons show greatly improved results. A trading profit of £58,172 is reported for the year ended September 30, 1936.

Straight Appointments

THE staff of the Straight Corporation has recently been increased by three, one of the new appointments being concerned with flying and training matters, another with aerodrome development, and a third with engine overhauls.

Mr. O. G. E. Roberts, who has joined as a director, is to be concerned with the flying side. He owns a Monospar ST12, is very fully qualified, and, in fact, won the blind flying trophy at A.S.T. a year or two ago. He has, of course, a "B" licence with an instructor's endorsement, and holds both Second Class Navigator's and W/T licences. He was educated at Eton and Sandhurst, and afterwards served in the Scots Guards.

The second appointment is that of Mr. J. W. D. Rowlandson, who has come from the Air Ministry, where he was on the operational staff of the home section of the Department of Civil Aviation.

Mr. W. Lancaster, the third new member of the staff, will be in charge of the engine overhaul depot at Ipswich, and was formerly on the staff of British Airways.

COOLERS and HEATERS

(*Concluded from page 215*)

larger tubes placed in the front. The heat taken from these tubes is carried over the small high-efficiency tubes behind them, thus preventing congelation.

The firm have carried out a great deal of research in each of their sections and submit designs to suit the special requirements of each aircraft manufacturer. In this way the combined oil cooler and cabin heater for certain Gloster machines and for Airspeed aircraft used in the tropics were evolved.

Cabin heaters for the heavy bombers are quite small and have condensers so that the water does not need frequent replenishment.

The new quick-refuelling anti-surge tank embodies hinged baffles which take up a horizontal position when the filler cap is opened. The inlet pipe is then arranged so that fuel flows in below the baffles and drives air out above them, so preventing a possible air-lock. When the cap is closed a system of levers moves the hinged baffles back to the vertical.

The weight of this new tank will be little more, if any, than the present types, which can be made of aluminium, duralumin, or magnesium.

The Gallay works are in Edgware Road, Cricklewood, London, N.W.2.